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ABSTRACT

The purpose of this study was to determine whether or not the elementary school principal has an impact on the outcomes of schooling manifested by students and, if so, to determine the nature of the role of the principal in influencing cognitive and affective outcomes manifested by students. The three sets of principal-related variables used were background, leadership, and utilization of time. From a national sample of 41 Individually Guided Education (IGE) schools, a subsample of 28 principals was generated for use in the study. Pearson Product-Moment correlations, multiple regression analysis, and path analysis were used to analyze the data. In general, results showed that principals do make a difference in producing student outcomes. The principal-related variables were significantly related to student achievement in reading and math and to student self-concept. Suggestions for further study include (1) developing an instrument to measure students' perceptions of the principals' leadership, (2) studying other subsystems in the schooling process, (3) conducting additional studies using path analysis techniques, and (4) gathering data on individual students. (Author/LD)

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Technical Report No. 492

DO PRINCIPALS MAKE A DIFFERENCE? THE RELATIONSHIP BETWEEN PRINCIPAL-RELATED VARIABLES AND STUDENT OUTCOMES IN IGE SCHOOLS

by

Helen Watt Johnson

Report from the Project on
Studies of Administration and Organization for Instruction

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Dedication

This study is dedicated to the memory of my beloved grandmother, Mrs. Margie Watt, who always wanted a teacher, but who I hope will settle for an administrator.

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Abstract

DO PRINCIPALS MAKE A DIFFERENCE?
THE RELATIONSHIP BETWEEN PRINCIPAL-RELATED VARIABLES
AND STUDENT OUTCOMES IN IGE SCHOOLS

Helen Watt Johnson

Under the Supervision of Professor Richard A. Rossmiller

The purposes of this study were (1) to determine whether or not the principal has an impact on the outcomes of schooling manifested by pupils, and (2) to determine the nature of the role of the principal in influencing cognitive and affective outcomes manifested by pupils. A principal's "production function" was specified based on a conceptual framework for economic analysis of schooling. Three sets of principal-related variables were identified for inclusion in the model: background, leadership, and utilization of time. The background variables were considered as input variables, while the leadership and utilization of time variables were viewed as process variables according to the conceptual framework.

This study re-analyzed a set of data collected in the 1975-76 school year for use by three projects of the Wisconsin Research and Development Center. From a national sample of 41 IGE schools, a subsample of 28 principals was generated for use in the present

study. Average school scores were used as the unit of analysis. Pearson Product-Moment correlations, multiple regression analysis, and path analysis were used to analyze the data.

Generally, the results showed that principals do make a difference in the "production" of student outcomes. This conclusion is based on the following findings:

1. Subscales of principal leadership, utilization of time, and background variables were significantly related to subscales of student achievement in Reading and Mathematics.
2. Subscales of principal leadership, utilization of time, and background variables were significantly related to subscales of student self-concept (Self-Observation Scales).
3. The variables most important in the "production" of student achievement in Reading and Mathematics include "Participation in an IGE Workshop," "Sex," and "Goal Emphasis."
4. The variables most important in the "production" of student self-concept include "Number of Professional Organizational Meetings Attended," "Membership on District Committees," "Total Noninstructional Time," "Interaction Facilitation," and "Goal Emphasis."

5. A number of anticipated findings were not borne out in this study. For example, there was no relationship found between the principal's use of time and student achievement. Furthermore, the direct or indirect nature of the principal's linkage to student outcomes was not established.

These findings prompted suggestions for future research.

APPROVED: Richard A. Rossmiller
Richard A. Rossmiller

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CHAPTER I

INTRODUCTION

The decades of the 1960's and 1970's may be recorded as the era when education was placed under harsh scrutiny and some of its mysticism unveiled. During this period, the once sacred institution of education became the object of distrust. The question, "Do schools make a difference?" was actually put to empirical test and has remained fair game for those insistent upon imposing efficiency standards on the schools. In attempting to answer this question, practically every aspect of the schooling process has been studied in some depth--teachers, expenditures, material resources, and curriculum have all been examined at some point for clues as to the adequacy of the schools in educating pupils.

"Do principals make a difference?" is a question that has seldom been raised. Whether the principal is viewed as the building manager or the head teacher, he or she is the chief school officer and is accountable to superiors and patrons for all school outcomes, including pupil cognitive and affective development. Yet, the handful of studies which have considered the principal have given only cursory attention to the role of the principal in the education production process and have viewed the principal as secondary to other categories of school resources.

As the official "gatekeeper" of the institution, the principal's activities are viewed as peripheral to the actual learning experiences in the school. For too long the principal has been associated with keeping the peace and providing the resources so that the "important" work of the school can proceed smoothly. The principal, as key decision maker and building leader, is in a position to either enhance or frustrate the attempts of the teaching staff or parental groups in attaining the goal of the educational program. The purpose of this study is to take a closer look at the principal as a vital resource in the schooling process--a resource which impacts not only on the atmosphere of the school but on the educational experience and outcomes of pupils as well.

Productivity in Education

During the past decade or so, there has arisen a great deal of concern for student outcomes in the nation's schools. This concern is prompted by the fact that the national educational budget has increased at a rapid rate while, at the same time, certain groups of children do not seem to be achieving at satisfactory levels. Furthermore, with increased concern for equality of educational opportunity for the handicapped, the disadvantaged, and more recently, the gifted, existing outlays have been required to cover a wider range of needs. Thus, educators have been confronted with demands for more efficient use of the resources placed at their

disposal (Frohreich, 1977). Many educational researchers have turned to systems theory and economics for help in dealing with the problems of research allocation in the schools.

General Systems Theory

A system has been defined as "a set of units or elements which are actively interrelated and which operate in some sense as a bounded unit" (Baker, 1973). The systems concept is important in that it provides a mechanism for studying problems of a complex and dynamic nature. Actually, the systems view of organization and/or reality has long been a tool of scientists, engineers, and economists in looking at complex phenomena in their respective realms. The use of systems analysis for quantifying aspects of the system has contributed greatly to conceptual and practical advances in these disciplines.

The idea of viewing the school as a system and the use of systems analysis as a tool has gained much support in the field of education. Much of the progress in delineating the processes and products characteristic of educational settings has resulted from the use of systems techniques.

Kershaw and McKean (1959) were among the first researchers to apply systems analysis to educational problems. Essentially, their aim was to explore the possibility of using systems analysis in making "quantitative comparisons of education systems" (p. 1). Their approach was to look explicitly at all of the relevant inputs

or other variables, and to examine the system as a whole to show the impact of changes in one input on other variables as well as on the output of the system. This information, in combination with cost-output data, would be of great value to the educational decision maker in comparing alternative programs or processes according to the authors.

Although more and more attention has been given to systems analysis in the social sciences, it appears that many of the assumptions observed in the natural sciences in applying this tool are violated when systems analysis is applied by social scientists. Misuse of the tool in this manner could render it useless in explaining and describing phenomena under investigation. Blalock and Blalock (1972), taking note of this situation, listed several potential trouble spots of which social scientists should be made aware when they apply systems analysis techniques to social systems. These problems include how one looks at the social system, how the structure of the system is specified, and specification of equilibrium conditions.

The foregoing points are further elaborated in a discussion by Hagen. Hagen (1972) listed six logical requirements of general systems analysis: (1) defining the elements of the model and their interrelationships; (2) measuring the elements of the system; (3) specifying the parameters of the open system; (4) stating the conditions for equilibrium in the system; (5) determining the conditions

of a homeostatic model. The problems of meeting these requirements within a social system context immediately become evident. In an educational setting, for example, it is extremely difficult to define all the myriad variables and their interrelationships which comprise the educational process. Fulfilling the second requirement would be even more difficult in view of the fact that many of the elements thought to be important in the educational system are qualitative in nature. Finally, establishing the parameters of the system is complicated by factors such as the home background of pupils and government controls which impinge on the system's operation.

Aspects of equilibrium are the subject of the last three requirements listed by Hagen. These questions are seldom broached in the treatments of systems analysis found in the education literature. Yet, the concept of equilibrium has exciting possibilities for unlocking some of the mysteries of the schooling process. Educational researchers could take a lesson from the field of economics where equilibrium is embodied in the concept of Pareto optimality, or from accounting where it is represented by the balance sheet. Properly applied in educational settings, the concept of equilibrium would enable researchers to make assumptions about the variables which are to be held constant, and to state more precisely the relationships between two or more variables under equilibrium conditions.

Systems analysis, then, aids the researcher in picturing the structural aspects of the system in a quantitative manner. However,

one must turn to the field of economics to determine the most productive use of the system.

Economic Theory of the Firm

In determining the most efficient use of school resources, educational researchers have in recent years tried to adapt the economist's production function to educational settings. The concept of an educational production function is based on the economic theory of the firm. The production function has proved useful to the entrepreneur in deciding what combinations of inputs will produce the maximum obtainable output. Thus, "the entrepreneur's production function gives mathematical expression to the relationship between the quantities of inputs he employs and the quantity of output he produces" (Henderson, 1958, p. 42).

Just as one must exercise caution in applying systems analysis to education, care must also be taken in applying the economic theory of the firm and its tools to educational concerns. Several conditions underlying the theory of the firm must be satisfied in applying the tool to education. These include: (1) maximization of output; (2) discretion over the input mix; (3) reliable and systematic measure of output; and (4) knowledge of the production process. A number of educational researchers, of course, are aware of these conditions and the problems they pose for use of the theory of the firm in educational settings and have discussed at length the implications of these problems for education (Levin, 1970; Winkler,

1977). Despite the obvious limitations of the tool, most researchers concur with the statement made by Murnane (1975):

> The production function approach does provide a useful framework for organizing and thinking about the relationship between resource allocation and the achievement of goals. When carefully applied, with due caution exercised concerning the quality of the data and the tentative nature of the results, production function research can make a substantial contribution to the store of knowledge available to policy makers trying to improve the quality of American education (p. 7).

The Production Function in Education

In accordance with the industrial model of production, education is viewed as a firm which transforms human and material resource inputs into desired outputs. The education production function is the formal statement of educational input-output relationships. Levin (1970) has depicted the production function of an educational enterprise as follows:

$$A = f\ (B, X_1, X_2, \ldots, X_n),$$

where "A signifies a measure of educational outcomes, B denotes the nature of the student clientele, and X_1, X_2, ..., X_n represents a set of inputs or resources used by the schools to produce education" (p. 176).

The two major problems of the educational researcher in making use of production function analysis include (1) specification of the production function, and (2) estimation of the production function. Specification of the production function involves identifying all

variables and their interrelationships which have an impact on the learning of pupils. Estimation of the production function concerns those statistical techniques used to estimate the parameters of the proposed model of the educational process. Taken together these two concepts shed light on the nature of the technology of the educational process and its outcomes.

Problems involving the technology of the educational process gained national attention with the release of the famous (or infamous) Coleman Report (1966) and have remained a preoccupation of researchers using the production function approach. Coleman and his colleagues were commissioned by the U.S. Office of Education to conduct a survey "concerning the lack of availability of equal educational opportunity in the United States" (Coleman, 1966). Perhaps the greatest contribution of the survey was that it amassed a comprehensive set of data on the school and home environments of over 600,000 pupils spanning the entire nation.

If the Coleman Report was praised for its comprehensive data base, it was attacked because of its finding that school resources made virtually no contribution to student achievement. Some groups viewed inferences of this kind as heretical and bordering on the seditious. Like scriptures in the Bible, the text of the Coleman Report has been used by opposing sides to support or to denounce increased funding of schools. Fortunately, the data were made available to responsible researchers and a number of studies appeared as a result of additional analyses of the data.

One of the most immediate criticisms of the Coleman Report was related to the problem of model estimation. That is, statistical bias was said to be introduced into the model due to multicollinearity (Bowles and Levin, 1968). Although the statistical problems associated with estimating the model were very important, many of the researchers who re-evaluated the Coleman data were more fascinated with the problems of model specification. These researchers were of the opinion that Coleman's model was misspecified because there was no comprehensive, generally accepted, theoretical framework available to guide the researchers in determining the variables which were most important in the educational process. Much of the research done in reaction to the Coleman findings emphasized the development of a conceptual model of the educational process. The next portion of this section will be devoted to a review of some of these models and their contributions to the state of the art.

Formal schooling is one of the oldest institutions in the civilized world; yet, the educational process remains enshrouded in mysticism. This situation results not so much from a lack of information about learning as from the inability of learning specialists to pull together all of the bits and pieces of information into a unified theory. Educational researchers intent on specifying a model of the educational production process have been forced to resort to ad hoc selection of variables which portend to explain how education is produced.

The lack of a clearly specified technology identified with the educational production process is in direct violation of the theory of the firm as discussed earlier in this chapter. Central to the concept of a production function based on the theory of the firm is the assumption that the technology is known, that is, technical efficiency is presupposed (Henderson, 1958). Before any attempt can be made to maximize efficiency in allocation of resources to the production process, there must exist knowledge of the variables and combinations of variables that are involved in the process. This has been the major task confronting the post-Coleman writers in their attempts to develop a conceptual model of the schooling process.

One of the prime concerns in model building is model specification, i.e., determining those variables which should be included in the model and those which should be excluded. Bowles (1970) was one of the first researchers to formulate an a priori representation of the relationship between student and school inputs and school outputs. The variables Bowles specified included a set of parent inputs, school inputs, and student IQ. Bowles reported his model as being of value "both in descriptive studies of human capital formation and in normative investigations to determine optimal educational resource allocation" (p. 12).

Hanushek (1972) is one of the most prolific and the most quoted of the model-builders. In a reanalysis of the Coleman data he set out to clarify some of the conceptual and methodological

underpinnings of the educational process. Hanushek's objective was to develop "a general decision-making framework, borrowed from the economic theory of production, which [could] be applied to managing the educational system" (p. 11). He conceded that his product was only a rudimentary framework from which a production function could be developed. The variables used to specify the model included home and family variables, school variables, innate endowments of pupils, and a set of variables not included in the Bowles model--peer variables. The unique features of Hanushek's conceptual model include (1) the cumulative nature of education, (2) the confluence of different inputs to education, and (3) the multidimensional nature of output.

Levin (1970) borrowed extensively from the early work of Hanushek in formulating his model of the educational process. Like Hanushek, Levin conceived of the educational process as cumulative in nature and specified in his model all of the variables used in Hanushek's model. However, Levin expanded the list of variables to include those external influences that impinge on the educational production process, as well as variables describing the attitudes of students and parents, educational motivations, parental expectations, and children's sense of efficacy. Another unique contribution of Levin was his conceptualization of the simultaneous nature of academic achievement and attitudinal factors.

The concept of simultaneity was further explored and expanded in the work of Boardman (1977). Boardman modeled the educational process as a system of six simultaneous equations. According to Boardman, his study improved upon the use of the Coleman data (which he reanalyzed) in that he "developed a new model, used appropriate methodology, and achieved new results" (p. 24). Possibly Boardman's greatest contribution to education production function analysis is his recognition that the educational process has multiple, interrelated outputs and that the model should consist of several simultaneous equations as mentioned above. Boardman's model consists of four endogenous variables and 42 exogenous variables, a considerable expansion over previous models posited. Another interesting point is that the endogenous variables--achievement, motivation, expectations, and efficacy--are reminiscent of Levin's model. To summarize, the contributions of the Boardman study include:

(1) recognition that the educational process has multiple outputs;
(2) recognition that the variables in the educational process are interactive; and
(3) categorization of the variables into endogenous and exogenous groupings in relation to outputs.

The final model to be considered is Winkler's version of the education production process. Unlike most of the preceding models, Winkler did not base his model on analysis of the Coleman data. Instead, he used a sample of 3,200 elementary and secondary school students in the Richmond, Virginia area. Winkler's model resembled the constructs used in clinical psychology in studying learning

theory. The variables which are important to the educational process, according to Winkler (1977), are: (1) genetic potential of the student; (2) motivation of the student; (3) stimuli received by the student; and (4) rewards received by the student. Three of these four categories have roots in both the home and school environments.

Examination of operationalized versions of the variable categories proposed by Winkler, reveals that many of the variables considered by Winkler to be crucial to the production of education are the same variables that have been postulated by other researchers. The precise nature of the variables is not the issue at this stage of modeling the educational process. What is important is that writers are putting an end to "implicit theorizing" in their efforts to identify the variables which belong in their model. The researchers cited above have tried to develop a rationale grounded in an explicit conceptual framework to guide them in investigating the process of schooling.

Guthrie (1970) has compiled a summary of findings of a number of education production function studies. An expanded version of this summary appears in Table 1 by author, sample used, measure of pupil performance, and identification of school variables found to impact on the criterion variable. It is interesting to note that the variables recurring most often were teacher related variables such as teacher experience, ability, and training (14 studies),

TABLE 1

SUMMARY CHART OF EFFECTIVENESS STUDIES ON SCHOOL SERVICE COMPONENTS

Study Author(s)	Description of Sample	Measure of Pupil Performance (School Output)	Measure(s) of Effective School Service Component(s) (School Input)
1. Mollenkopf and Melville	U.S., 17,000 9th (in 100 schools) and 12th (in 106 schools) grade, male and female	Aptitude and achievement tests	1. Number of special staff 2. Class size 3. Pupil-teacher ratio 4. Instructional expenditures
2. Goodman	New York, 70,000 7th and 11th grade, male and female in 102 school districts	Achievement test	1. Number of special staff 2. Instructional expenditures 3. Teachers' experience 4. "Classroom atmosphere"
3. Thomas	Project TALENT Sample (national) 10th and 12th grade, male and female	Achievement test	1. Teachers' salaries 2. Teachers' experience 3. Number of library books
4. Green, et al.	Virginia (Primarily Negro) Secondary students	Stanford Achievement Test	1. Aggregate measure of entire instructional program
5. Benson	California 5th grade, 249 school districts	Reading achievement test	1. Teachers' salaries 2. Administrators' salaries 3. Instructional expenditures
6. Kiesling	New York, 70,000 7th and 11th grade male and female in 102 school districts	Achievement test	1. Expenditure per pupil (in large school districts)
7. Coleman Report	U.S. sample	Verbal ability test	1. Teachers' verbal ability
8. Shaycoft	U.S. 108 schools 6,500 9th and 12th grade, male and female	Battery of 42 aptitude and achievement tests	1. Curriculum variables

TABLE 1 (continued)

Study Author(s)	Description of Sample	Measure of Pupil Performance (School Output)	Measure(s) of Effective School Service Component(s) (School Input)
9. Burkhead	90,000 Chicago high schools students in 39 schools. 19,000 Atlanta High School students in 22 schools and 100 small community high schools	Aptitude and achievement tests and school holding power	1. Age of building 2. Teachers' experience 3. Teacher turnover 4. Teachers' salary
10. Plowden Report	English elementary school students		1. Age of building 2. Teachers' experience 3. Teachers' academic preparation 4. Teachers' "ability"
11. Cohn	Iowa high school students in 377 school districts	Achievement test	1. Teachers' salary 2. Number of instructional assignments per teacher 3. School size
12. Raymond	W. Virginia 5,000 high school students	Freshman year (college) GPA and achievement test scores	1. Teachers' salary
13. Katzman	Boston elementary school students	School attendance, school holding power, Reading achievement, Special school entrance examination	1. Pupils per classroom 2. Student-staff ratio 3. Attendance district enrollment 4. Teachers' employment status 5. Teachers' degree level 6. Teachers' experience 7. Teacher turnover ratio
14. Bowles (1)	U.S. 12th grade Negro males	Verbal ability test	1. Teachers' verbal ability 2. Science laboratory facilities 3. Length of school year
15. Bowles (2)	U.S. 12th grade Negro males	Mathematics and reading achievement test and a test of general academic ability	1. Class size 2. Ability grouping 3. Level of teacher training 4. Age of school building 5. Expenditures per pupil

TABLE 1 (continued)

Study Author(s)	Description of Sample	Measure of Pupil Performance (School Output)	Measure(s) of Effective School Service Component(s) (School Input)
16. Bowles & Levin	12th grade Negro students and 12th grade white students	Verbal ability test scores	1. Teachers' verbal ability 2. Teachers' salary
17. Hanushek	6th grade white students in 471 schools and 6th grade Negro students in 242 schools	Verbal ability test	1. Teachers' verbal ability 2. Teachers' experience
18. Ribich	Project TALENT Sample	Achievement test	1. Expenditures per pupil
19. Guthrie, et al.	5,284 6th grade students in Michigan	Reading ability, Mathematics understanding, Verbal facility	1. School site size 2. Building age 3. Percent classrooms makeshift 4. Library volumes 5. Textbook supply 6. Teachers' verbal ability 7. Teachers' experience 8. Teachers' job satisfaction 9. School size (enrollment) 10. Classrooms per 1,000 students 11. Percent of students transferring
20. Summers & Wolfe	Elementary, junior and senior high school students in Philadelphia	Achievement score	Heterogeneous race and ability grouping, no disruption
21. Murnane	Second and third grade Blacks in New Haven	Achievement score	Student turnover; teacher race and sex; teacher years of experience

TABLE 1 (continued)

Study Author(s)	Description of Sample	Measure of Pupil Performance (School Output)	Measure(s) of Effective School Service Component(s) (School Input)
22. Winkler	Elementary and secondary schools in Richmond	Achievement score and I.Q. score	Whites: teacher salary and experience; B.A. quality Blacks: teacher salary; B.A. quality; proportion male teachers; migration rate of teachers
23. Boardman	EEOR data 12th grade blacks and whites	Achievement, motivation, expectations, efficacy	Teachers' ability; number of teachers per pupil; teachers' experience; proportion of white teachers; teachers' perceptions of lack of administrative leadership; proportion of teachers spending most of their lives in the town where they presently live

Source: Guthrie, James W. A survey of school effectiveness studies. In Alexander M. Mood (ed.), Do teachers make a difference? Washington, D. C.: U.S. Government Printing Office, 1970.

followed by teacher salary variables (7 studies), instructional expenditures (5 studies), and school/class size (5 studies).

A Conceptual Framework for Economic Analysis of Schooling

The conceptual framework which guided the present inquiry was that formulated by Rossmiller and Geske (1977) and shown in Figure 1. Their framework serves as a systems model of the educational production process under school conditions and provides a heuristic framework for analyzing and thinking about the problems inherent in maximizing the productivity of the resources used in schools (Rossmiller and Geske, 1977, p. 53). They viewed school resource allocation as primarily an economic problem and stated that the tools of economics and systems analysis should be applied to seek answers to questions concerning the efficient utilization of school resources. The model consists of four components: (1) inputs to the educational system, including policies which constrain and/or control the system's operation; (2) the formal educational system (school) and the processes associated with that system; (3) outputs of the educational system; and (4) feedback. The framework traces the resources which are provided to the formal educational system from its external environment through the educational process which occurs within the school, to the educational outcomes.

The present study represents an attempt at specifying a model of the role of the principal in the educational production

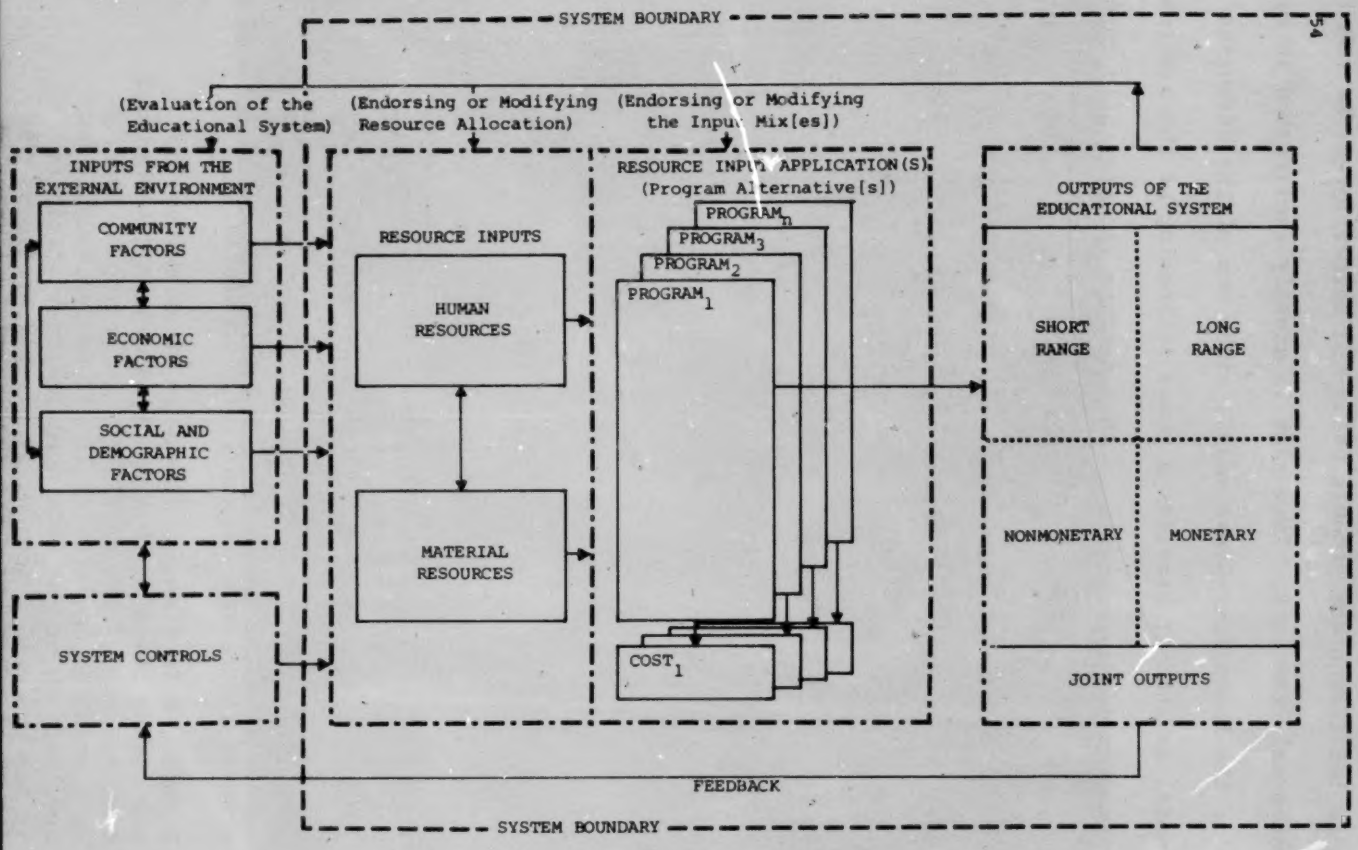

Figure 1. A conceptual framework of the educational production process under school conditions.

Source: Rossmiller, R. A., & Geske, T. G. Economic analysis of education: A conceptual framework. Theoretical Paper No. 68. Wisconsin Research and Development Center for Cognitive Learning, October, 1977.

process in IGE elementary schools using the Rossmiller-Geske model as a conceptual framework. This task is greatly facilitated through the use of the Rossmiller-Geske model, since one of the strengths of the model is that it provides a means of looking at the process aspect of educational production. This feature is especially important in studying the role of the principal in the schooling process, since many of the variables which would appear to be strongly associated with the principal's impact on school outputs, e.g., leadership, are best viewed as process variables.

According to Rossmiller and Geske, their model will accommodate with equal facility the state, district, building, or classroom as the unit of analysis. Going a step further, the present study focused on an individual (the principal) in the education production process and the characteristics associated with that individual. In this study, the principal was viewed as a subsystem of the schooling process, interacting with other subsystems of the school, e.g., teachers, pupils, curriculum systems, in making his or her unique contribution to outcomes of the system.

The idea of viewing an individual as a subsystem is not new in the systems literature. Hagen (1972) commented:

> A variable is a single dimension of an entity, not the entity itself. Thus a variable is not a physical body but one of its qualities, for example, length; in a model of society, it is not an individual, but say, each value and each need (motive) attributed to him and each component of his perception of the nature of the world. The individual as a group of interacting elements may be a subsystem within the model (p. 75).

If the principal is to be studied as a subsystem of the larger system, acting out his or her own particular role, making a unique contribution to school outcomes, and acting in relationship to other parts of the system, specification of the variables related to the principal as a subsystem is necessary.

There are at least two ways in which to specify a "principal's production function." First, one could resort to implicit theorizing. That is, one could include variables in a whimsical and arbitrary manner without relying on a rational framework. Implicit theorizing often results from data constraints and limitations posed by the hypothesis to be tested. A second method is more scientific and is reminiscent of the method used by researchers using the Coleman data to model the educational process. According to this method, a model of schooling is constructed by compiling the findings of research related to the model to be formulated. From these findings, only those variables which conform to a preconceived rationale of how the educational process should work are used to specify the model.

The present study tried to conform to the second method described above. However, strict adherence to the more scientific procedure was not possible for two main reasons. First, this study relied on a pre-existing dataset so the range of variables to be considered was predetermined. Second, the available studies focusing on the principal in the educational production process

provided little guidance in screening those variables which had proved to be important in the past. Empirical studies reviewed appear in the following section.

The Principal and Student Achievement

The belief that the principal influences pupil outcomes in the schooling process is not entirely supported by empirical research. Studies which have focused on the principal as a part of the educational process are reported in this section. It is noteworthy that only a handful of studies have paid attention to the principal in specifying a model of the educational production process. Although some information on the principal was collected by Coleman, this information was conspicuously absent from the analysis of the data.

Most of the comprehensive studies (such as the Coleman Report) have been more concerned with teacher variables and other school input variables than with principal related variables in specifying the educational production function. It should be emphasized at this point that this study does not minimize the role of the teacher and other school variables in the process of educating pupils. It is recognized that teachers, armed with their arsenal of curriculum materials, pedagogical techniques, and personal attributes, constitute the primary technology of the learning process. However, teachers and variables associated with teachers do not account for all of the variance in student achievement. To

discover the true nature of the educational process, all variables associated with that process must be studied. The present study attempted to investigate a subsystem of variables--those related to the principal--which has been given minimal attention.

A small number of large-scale studies have been reported in recent years in which the principal was viewed as a factor in the education production process (along with a host of other variables).

Mayeske (1972), in a nationwide study of American schools, found no specific relationship between student achievement and such characteristics of the principal as training, salary, and degree level. However, using the principal's training as a proxy for the other two principal-related variables, Mayeske found a strong association between this variable and the percentage of students enrolled in remedial reading and mathematics courses (p. 32).

In a New York report (1972), an extensive survey of the literature was undertaken to determine variables which were consistently related to student performance. Only eight studies were found which indicated that variables related to the principal were associated with student performance, and only four variables were identified in these eight research efforts: (1) salary, (2) years of experience, (3) degree level, and (4) number of pupils per principal or supervisor. Only the number of pupils per principal (principal quality) was found to influence the educational outcomes under investigation (p. 6).

Landes (1969), in a study conducted in the New York City schools, found that principals' attitudes about administration and teaching explained a large percentage of the variance in reading score improvement of the pupils sampled. According to Landes, "significant improvements in reading skills were associated with a principal's belief that he had a competent professional staff . . ., respected his teachers' aides working in a classroom and used them extensively, had meaningful parent and community involvement in the school and practiced or supported innovative administrative or teaching techniques" (p. 13).

Although the foregoing attitudes and beliefs of the principal were subsumed in the Landes study under the rubric of "school quality index," they could just as easily be identified with the principal's supportive leadership behavior. The variable of principal's leadership was believed to be of prime importance in the production of schooling according to the present study. The three remaining studies reported emphasized the principal's leadership as a variable.

Summers and Wolfe (1974), in a citywide study of Philadelphia schools, looked at principals' experience, degree held, and extra educational credits and found no relationship to achievement by students in sixth, eighth, and twelfth grades. The authors' implication was that leadership would have been a better measure of the principal's influence on the educational production process:

> The measurable characteristics of school principals do not appear to be particularly effective in increasing student achievement. . . . Most likely,

> the things principals can do to be effective, like display a sense of leadership, are things which are not picked up by these measures (p. 16).

Other more recent studies of the education production function have not borne out Summers and Wolfe's notion. In fact, these studies have uncovered a negative relationship between principal leadership characteristics and student outcomes. Boardman (1977), using the Coleman data, found a positive relationship between teachers' perception of a lack of administrative leadership (as perceived by teachers) and achievement and motivation of students. Similarly, Rossmiller (1978) found a negative relationship when teachers' perception of their principal's leader behavior was regressed against student achievement in reading and mathematics using data from a sample of IGE schools.

The Principal and Student Self-Concept

LaBenne and Greene (1969) have defined student self-concept as "the person's total appraisal of his appearance, background and origins, abilities, resources, attitudes and feelings which culminate as a directing force in behavior" (p. 10). The effect of schooling on the student's self-concept is ambiguous. Purkey (1970) in summarizing empirical studies of self-concept and school achievement, was convinced that there is "continuous interaction between the self and academic achievement, and that each directly influences the other" (p. 23).

There is some evidence that student self-concept influences achievement. Stenner and Katzenmeyer (1976), in a study of sixth

grade students, found that "self-concept was shown to add significantly to the prediction equation for achievement over and above the contribution of non-verbal intelligence. The SOS accounted for twenty-two percent of the variance in reading achievement" (p. 270).

Evidence of the effect of the school and its resources on student concept, however, is inconclusive. Bocian (1976) found no significant relationship between I and R Unit effectiveness and student affective behavior as measured by the Self-Observation Scales. Boardman (1977) found a positive but low correlation between principal's lack of administrative leadership as perceived by teachers and student efficacy (self-concept).

These findings are tentative and leave much to be desired in enlightening the effect of the principal on student cognitive and affective outcomes. These results further emphasize the fact that the literature to date concerning the principal's contribution to the educational process is shallow and a more in-depth approach is needed. The studies reviewed provided evidence, though shaky, that two categories of variables might prove useful in studying the principal in the educational process. These include "background" and "leadership" variables. These categories fit well into the Rossmiller-Geske Conceptual Framework and data constraints did not present a problem. A third category, "use of time," was added and the model of the principal in the educational process was ready for specification.

Specifying the Principal's Production Function

If one accepts the idea that the principal may be viewed as a subsystem of the larger system which is the school, then one can more readily subscribe to the argument that the principal has a special and important role to play in the production of education, a role which is embodied in the principal's production function. It should be emphasized that the production function specified here is not intended to be a complete model of the educational production process. According to models of the educational process mentioned earlier, variables to be included should consist of home and backyard, peer, and school variables. The variables associated with the principal studied here reflect only the latter category of variables. The Rossmiller-Geske conceptual framework described earlier is helpful in representing the principal's production function.

The conceptual framework portrays the production of education as an open system. Learning at the school building level does not take place in a vacuum. Inputs from the system's environment such as community values, economic factors, demographic factors, and legal requirements help to shape the educational decisions made in the school. Outputs of the school provide feedback to the community which serve to validate or modify the inputs it provides and the cycle is repeated. While the concept of the open system vis-à-vis the school is recognized as extremely important, the data which were available for this study will not permit such an investigation. As concerns the principal, environmental inputs would take the form of

home endowments such as IQ and family socioeconomic status. This kind of information was not available for the principals. Thus, this study will concentrate on those elements of the conceptual framework which describe resource inputs, resource input mix (process), and outputs of the school.

Inputs. In viewing the principal as a subsystem, the first step is to look at the input variables characteristic of the principal. In terms of the Rossmiller-Geske framework, the principal would be considered a human resource input. Nadler (1976) has further viewed human resource inputs as human catalysts in that human catalysts aid in the contributions to production of other inputs without themselves becoming a part of the output. Nadler's distinction aids in separating pupil inputs, which do become part of the output, from other human resource inputs such as teachers and administrators.

The principal as an input can be further analyzed in terms of human capital inputs and personalistic inputs brought to the system. The concept of human capital is relatively new in the economic literature. According to the human capital theorists, human productivity can be increased by education, training, and health care. Schultz (1970), considered by many to be the father of the human capital movement, regarded the concept of human capital as "a source of many new analytical insights with respect to particular classes of economic behavior" (p. 298). Over the years, theorists and empiricists have looked at human capital as a tool in analyzing economic growth, the educated labor force, and personal distribution

of income, to name only a few of the major issues. Other proponents of the human capital concept are Becker (1967) and Mincer (1958).

Human capital variables associated with the principal in the education production function studies previously mentioned included the principal's education (e.g., degree level), and experience. It should be noted that each person starts with a certain human capital endowment from their genetic inheritance and home background, but the data concerning these variables were not available for the principals in this study. The principal's educational level reflects human capital accumulated through schooling while the principal's experience variable mirrors human capital accumulation through training on the job.

The personalistic input variables may be viewed as those characteristics, preferences, or attributes associated with the person of the administrator. Personalistic input variables represented by the principal as a resource may be measured by the principal's age, sex, or marital status. Background information concerning the human capital and personalistic characteristics of principals has been made available for the present study (see Appendix A).

Process. Educational systems have been called "organized anarchies" (March, Simon & Olsen, 1972). A sure sign of an organized anarchy, according to proponents of this paradoxical concept, is that the organization is characterized by an unclear technology. That is, the methods and processes by which inputs are transformed into products are unspecified or uncertain. A very important distinction

between educational production and other kinds of production, e.g., industrial firms, is that in the case of the former, the process itself, more so than the product, is the object of interest. Actually, the products of education, such as achievement scores and diplomas, are merely symbols of the process of education. Unfortunately, the process, which is the only indication the system has that education has taken place, is the aspect of which little is known.

One of the unique and important contributions of the Rossmiller-Geske model is that in emphasizing the process, or resource input mix, of the system, the elusive "black box" traditionally associated with input-output studies begins to reveal its inner workings. The major process variables associated with the principal in the present study are the principal's leadership as perceived by teachers, and the manner in which the principal utilizes his or her time in the schooling process.

Time has been established in the literature as being related to learning (Bloom, 1974; Wiley & Harnischfager, 1974). The variables representing the manner in which the principal allocates his or her time in the school were taken from Rossmiller and Geske (1977). Time was divided between instructional and noninstructional time. As will be explored in greater detail later in this study, instructional time associated with the principal is minimal. However, it has been shown that principals in IGE schools spend slightly more time in instructional activities than their counterparts in traditional school settings (Rossmiller & Geske, 1977, p. 35).

Time was further subdivided into instructional and noninstructional time in order to facilitate the measurement of variables. Instructional time, for example, was categorized by instructional mode and curricular area (see Appendix B). The instructional mode categories consist of one-to-one instruction, small group, class size, large group, and other. The curricular areas include reading, mathematics, language arts, science, social studies, and other. Noninstructional time consisted of eight subgroupings: (1) supervision, (2) planning, (3) testing, (4) record keeping, (5) inservice, (6) clerical, (7) administrative, and (8) other.

Leadership is perhaps the variable of greatest interest in the study, for it provides a measure of how the principal's activities are perceived by others in the school. The leadership process as defined in this study represents the principal's attempt to initiate goals and structure in the school and to support the staff in their effort to achieve desired goals. The leadership construct used in this study was taken from Mendenhall (1976) and emphasizes four factors considered to be important dimensions of leadership: (1) goal emphasis, (2) support, (3) work facilitation, and (4) interaction facilitation. These dimensions will be discussed further elsewhere in the study. The important thing to note at this point is that a principal displaying all of the characteristics embodied in the four factors, according to the theory from which the four factors were derived, should have a definite and positive impact on organizational goals.

Outputs. A great deal of attention has been given to the outcomes of the schooling process. At least two overriding problems related to outputs of the school have gained prominence in the literature: (1) outputs are difficult to measure and (2) outputs are multidimensional in the educational system. Vaizey (1962) discussed the problems of determining exactly what the outputs of education are and the necessity of measurement of outcomes according to preconceived objectives. Rivlin (1973) listed six possible types of output measures of the educational process: (1) body counts, i.e., enrollment; (2) student exposure measures, i.e., course load; (3) student attainment measures, i.e., promotions; (4) student attitudes; (5) income increases; and (6) achievement testing. Most studies of the education production function use measures of student achievement as the indicator of school output.

The Rossmiller-Geske conceptual framework recognizes that value preferences come into play in determining the outcomes in a given school or school district. Furthermore, the conceptual framework provides for the multiplicity of outcomes in recognizing that outputs of the educational system may be classified as short-range and long-range, cognitive and affective, and monetary and nonmonetary. As mentioned earlier, the principal does not become a part of the output. However, the effectiveness of the principal is evaluated in relationship to outcomes. The outcome measures used in the present study were student achievement in reading and mathematics

taken from Sigurdson (1976), and student self-concept taken from Bocian (1976).

Purpose of the Study

The purpose of this study was to examine the role of the principal in elementary schools using the Individually Guided Education (IGE) system to determine whether or not the principal has an impact on the outcomes of schooling manifested by pupils. If indeed the principal was found to influence the outcomes manifested by pupils in the school, a second aim of the study was to determine the nature of the role of the principal in influencing cognitive and affective outcomes manifested by pupils. The research questions flowing from these two purposes can be stated thus:

1. Is there a relationship between principal-related background, leadership, and utilization of time variables and student achievement and self-concept outcomes?

2. Which of the principal-related background, leadership, and utilization of time variables have the greatest impact on student achievement and self-concept outcomes?

3. Is there a direct relationship between the principal-related background, leadership, and utilization of time variables and student achievement and self-concept outcomes, or is the relationship mediated by teacher and school climate variables?

Hypotheses to be Tested

To achieve the purpose of this research, the following null hypotheses were tested:

1. There is no significant relationship between the four subscales comprising principal leadership behavior (leader support, goal emphasis, work facilitation, and interaction facilitation) and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

2. There is no significant relationship between selected principal background variables (see Appendix A) and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

3. There is no significant relationship between principals' utilization of time (total instructional time, subscales of non-instructional time including supervision, planning, testing, record

keeping, inservice, clerical, administrative, and other) and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

4. There is no significant relationship between the four subscales comprising principal leadership behavior (leader support, goal emphasis, work facilitation, and interaction facilitation) and student self-concept as measured by the subscales of the Self-Observation Scales (SOS):

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affiliation

(g) School Affiliation

5. There is no significant relationship between selected principal background variables (see Appendix A) and student self-concept as measured by the subscales of the Self-Observation Scales:

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affiliation

(g) School Affilication

6. There is no significant relationship between principals' utilization of time variables and student self-concept as measured by the subscales of the Self Observation Scales:

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affilication

(g) School Affiliation

If the foregoing null hypotheses are rejected and there is found to be a relationship between the variables posited, three additional hypotheses are proposed:

1. There is a direct relationship between variables associated with the principal and student cognitive and affective outcomes.

2. The relationship between variables associated with the principal and student outcomes are mediated by teacher variables, e.g., teacher job satisfaction.

3. The relationship between variables associated with the principal and student outcomes are mediated by school climate variables, e.g., school size.

Significance of the Study

This study is important in that it will be the first study to provide a comprehensive investigation of principal characteristics and related variables as they impact on student cognitive and affective outcomes in IGE schools. The study has potential for adding to the body of knowledge on educational production function theories and techniques and may aid in clarifying the role of the principal in the educational production process.

Limitations of the Study

The most evident limitation of the present study lies in the fact that the data were collected in 1976. A problem associated with the use of such data is the fact that the scope of possible analyses becomes limited by the availability of needed data.

A second limitation stems from the nature of the analysis. A valid criticism of productivity research has been the unavailability of the micro-data needed to tie specific school resources to specific

pupils in looking at pupil outcomes. This study used aggregate data based on school means. Closely related to this limitation is the lack of longitudinal data which would be useful in detecting changes over time in output measures.

A final limitation related to the sample used in this study. That is, the sampling of only 28 principals, coupled with the fact that only IGE principals were considered, casts doubt on the generalizability of findings to non-IGE settings.

Summary

This chapter has attempted to set the stage for the study of the role of the principal in the educational process in schools. Recognizing that the contribution of the principal to educational productivity must be viewed in relation to the total school as well as in relation to other elements such as teachers and material resources which make up the educational production process, the first section of the chapter gave a brief introduction to the concept of productivity in education. It was shown that general systems theory, by facilitating a quantitative representation of the components of the educational system, and that the economic theory of the firm, by providing a key to the maximization of resource allocation within the system, have enlightened the educational production process.

The second major section of the chapter presented the conceptual framework used to place the principal in perspective in the educational process. It was revealed that the relationship of the

principal to educational outcomes (student) is fallow and could prove fertile in generating new information on the nature of schooling. A principal's production function was specified in terms of human capital and personal inputs, leadership and time as process, and student achievement as outputs of the system modeled on the Rossmiller-Geske conceptual framework.

The remainder of the study will focus on answering the question, "Do principals make a difference?" in the educational process as manifested by pupil achievement scores. Emphasis will be placed on the role of the principal as educational leader and a rather detailed discussion of leadership theory and its evaluation will be discussed. The principal's role in IGE will also be discussed in order to further illuminate the relationship of the principal to other components of the system.

Chapter three will deal with the design of the study. The sample selection, instrumentation and data collection will be delineated. The data analysis portion of this chapter will focus primarily on estimation of the parameters of the model, using stepwise multiple regression techniques.

Chapter four reports the results of the data analyses, and chapter five draws conclusions and presents implications for future research.

CHAPTER II

DO PRINCIPALS MAKE A DIFFERENCE?

Eye (1976) has defined the principal as "a person who has mastered the skills of coordinating educational purposes, teaching strategies, service personnel, time distribution, public interpretation, and the evaluative demands of one designated school unit within a total school system" (p. 189).

It was intimated in the previous chapter that the role of the school principal is of a dual nature. The principal must deal with such day-to-day activities as budgeting, scheduling, and handling of disciplinary problems. But at the same time, the principal must serve as a leader in planning and making decisions about curriculum, staffing, instructional materials, and other concerns related to the instructional program. The former activities represent the managerial aspect of the principal's role; the latter comprise the instructional leadership role.

The Principal as Instructional Leader

The concepts of leadership and management in some respects are diametrically opposed. Managers are seen as maintaining the status quo while leaders are thought of as agents of institutional change (Lipham, 1964). This paradox has yet to be resolved. Zaleznik (1977) postulated at least four basic differences between

leaders and managers: (1) attitudes toward goals, (2) conceptions of work, (3) relations with others, and (4) sense of self. According to Zaleznik, leaders and managers develop through two distinct sociological processes. Managers, he concluded, develop through socialization, "which prepares the individual to guide institutions and to maintain the existing balance of social relations" (p. 76). On the other hand, leaders, according to Zaleznik, "develop through personal mastery, which impels an individual to struggle for psychological and social change" (p. 75).

It is generally thought that a principal is most likely to influence student outcomes through his or her role as educational leader. Early writers quickly recognized that school principals were devoting a disproportionate amount of their time to management activities at the expense of staff leadership and a campaign was launched to bring about greater balance between the two functions of the principal. Soon the literature on school administration was replete with admonitions about the necessity for leadership in the schools. Representative of this literature is the statement made by Cubberley (1923) that "the principal ought to be the educational leader of the school" (p. 22). More recently, Lipham and Fruth (1976) have described the role of instructional leader as one in which the principal "initiates new goals, structures, and relationships in the instructional program" (p. 63).

In this study, leadership behavior was one of the primary constructs examined. Of specific concern to the present study were the consequences of the principal's leadership for pupil-related outcomes in the school. Leadership theory was reviewed to explain the leadership phenomenon, but more importantly, to predict the kind of leadership behavior that best elicits organizational effectiveness. The basic tenets of various approaches to the study of leadership were summarized and each approach was evaluated according to a set of specified criteria. Finally, the approach used in this study was discussed and evaluated.

Approaches to the Study of Leadership

There is general agreement in the current literature on at least four approaches to the study of leadership: (1) great man, (2) traitist, (3) situational, and (4) behavioral (Lipham, 1973). These four approaches have evolved simultaneously and they are not necessarily mutually exclusive. Their orientations hinge upon a particular definition of leadership and definite ideas concerning the relationship between the leader and the group.

The Great Man Approach. Until the 1930's, the leadership lore was dominated by the "great man" approach. According to this approach, leadership could best be understood by studying great leaders who could serve as "exemplars for lesser men," and who had "mastered and remade the times according to their viewpoints" (Burlingame, 1973, p. 46). Early writers used biographical and

autobiographical data to study these leaders and focused on such factors as (1) sense of missionary zeal, (2) ethic of work, and (3) intellectual base (pp. 52-54). Jennings (1960) conducted a comprehensive study of the great man literature and concluded that the great man approach was of little value in explaining leadership. In fact, according to Lipham (1973) the great man approach did more to "enshrine leaders" than to describe leadership and its mention in reviews of the leadership literature now tends to serve the same purpose as most eulogies. The following comment by Burlingame summarizes the basic problems of the great man approach:

> Leadership in American education does not appear to be a single person phenomenon. Shorter views, stressing a single educator, miss the contextual changes in society which seem to produce such great impact upon educators (p. 63).

The rise and fall of the great man approach can usefully be viewed in the context of organizational theory and its development. The evolution of leadership theory has a striking parallel with the development of organizational management theory. The "great man" shared a rather peaceful coexistence with the "Boss" in industry. Just as the great man literature endowed its leaders with a divine right to rule over the masses, the boss had almost unlimited authority to operate his business and workers served at his pleasure. However, with the rise of technology and all of its ramifications, institutions rendered the sole entrepreneur obsolete. A "technocracy" arose which took responsibility for all leadership

decisions (Galbraith, 1967). Zaleznik warned, however, that the great man may yet return, for

> Only history seems to show that no sooner do we feel secure in the Promised Land than the bureaucratic solution seems to come unstuck. A new crisis emerges and we wait expectantly for the appearance of the hero (p. 224).

The great man approach, for all its apparent faults, was nonetheless probably a necessary first step in the natural progression of the development of leadership theory. According to Saunders (1966), "A theory is not static but is continuously subject to change as experience and investigations render new knowledge which is applicable to the theory" (p. 6). While the initial tendency was to look at the whole person, the next step in the evolution of leadership theory was to focus on specific traits of leaders to develop an understanding of the leadership phenomenon.

The Trait Approach. According to the traitist approach to the study of leadership, leaders possess a combination of traits which enable them to induce others to follow them in the accomplishment of a goal (Tead, 1929). If looking at the great man himself failed to explain leadership, the combination of traits which he embodied certainly would succeed according to early traitists such as Bernard (1926), Bingham (1927), and Kilbourne (1935).

The traitist approach to leadership is often referred to as the psychological approach to leadership theory. According to Gibb (1954),

> For some quarter of a century between world wars, psychologists gave a large part of their attention to problems of personality and the measurement of personality. What interest there was in the description of leader behavior during this period was caught up in this tide and almost all of the work reported took the form of a search for traits of personality which were supposed to characterize "the leader" (p. 884).

The taxonomies of leadership traits generated from this barrage of studies were endless. Common to these listings of leadership traits were those referring to physical stature, intellectual abilities, and social charms. Bogardus (1934) identified four categories of leadership traits and used them as section headings in a published volume: (1) Genes and Genius, (2) Endocrines and Ability, (3) Opportunity, and (4) Association.

The early traitist literature can generally be classified as unsystematic in terms of measurement and basic approach to the investigation of leadership. Stogdill, who will be discussed later with the behaviorists, can be identified as one of the few writers who contributed some semblance of order to the trait approach. In synthesizing the traitist research and theory in 1948 and again in 1965, Stogdill offered three categories of variables which consistently proved useful in explaining leadership: (1) self-oriented traits, i.e., physical, intellectual, and personality; (2) task-oriented traits, i.e., achievement drive; and (3) social-oriented traits, i.e., cooperativeness, tact, and social ability.

Despite this synthesis of findings by Stogdill, the flaws of the trait approach were too numerous to render it useful in

theorizing about leadership. Gouldner (1965) found the trait literature to be fraught with difficulties involving the rank-ordering of traits, mutual exclusivity of traits, and the credibility of assumptions regarding the nature of personality. Possibly the greatest flaw of the trait approach was pointed out by Stogdill (1973), who concluded that the difference between the early trait theorists and more recent theorists is that the latter "speak of influencing interaction and role structures rather than dominating the followers or inducing compliance" (p. 85).

It is suggested here that the great man and traitist views of leadership have not been salient because their interpretation of leadership was myopic and unidimensional in that only personalistic characteristics of the leader were considered important. On the other hand, those approaches which have taken into account the interactive nature of organizational behavior are currently in vogue. The situationist and behaviorist views of leadership offer promise in that they recognize the interactive nature of the leadership process and the fact that organizational circumstances often mediate the relationships between leaders and followers.

The Situational Approach. The situational approach emphasizes the work group, the task, and the situation rather than personal characteristics of the leader. Recalling that the basic difference between the early traitists and their successors lay in the fact that the latter group began to appreciate the notion of leadership as a two-way process involving both leaders and followers, the

evolutionary thread connecting the traitists and the situationists becomes more apparent. Thus, the concept of the group in interaction has remained at the core of the situationist point of view.

Cartwright and Zander (1960) believed that the "nature of leadership behavior chosen for the performance of group functions will be influenced by situational factors both inside and outside the group" (p. 496). They saw the two basic group functions as group maintenance and goal attainment. They found also that the unique behavior of leaders over all situations and tasks was concerned with analyzing the situation and initiating the required action.

Other researchers and theorists have tried to isolate those situational variables which were believed to affect leadership. Seeman (1960) emphasized social status and postulated three kinds of situational factors: (1) internal group structure, (2) group differences, and (3) external factors as related to leader-member behavior. McGregor (1960) specified four major variables involved with leadership including characteristics of the leader, of the follower, of the organization itself, and of the political milieu.

However, it was not until the arrival of Fiedler on the scene that the situational approach gained prominence. Fiedler (1967) introduced the concept of effectiveness as related to leadership. According to Fiedler's Contingency Model, leadership effectiveness depends upon three mediating variables: task structure,

leader-member relations, and position power of the leader. Actually, according to the situationists, the leader is that individual given the task of directing and coordinating task-relevant group activities or who carries out the primary responsibility for performing group functions.

The Behavioral Approach. Behavioral leadership theories are believed to have resulted, in part, as a reaction to the great man and traitist points of view which dominated the early literature on leadership but revealed few consistent findings. The behavioral approach is similar to the situational approach in that the behaviorists are of the opinion that leadership can best be described by the behaviors of leaders in particular situations (Stogdill, 1973).

The leadership construct used in the present study is of the behavioral variety and has its roots in the leadership studies conducted at the Ohio State University and the University of Michigan beginning in the 1940's. Perhaps the most significant development emerging from the Ohio State leadership studies was the Leadership Behavior Description Questionnaire, an instrument used to measure leadership and consisting originally of nine dimensions of leadership. The LBDQ, as it was later to be called, lies at the core of the behavioral theory of leadership.

From its very inception it was recognized that the LBDQ was destined to give impetus to the behaviorist view of leadership and thus captured the attention of a number of researchers. For over a

decade, the LBDQ was subjected to a series of prunings which resulted in much of the overlapping content being weeded out. Hemphill and Coons (1957) reduced the instrument to eight dimensions. Halpin and Winer (1957), through factor analysis, further trimmed the LBDQ until only consideration, initiating structure, production emphasis, and sensitivity remained as dimensions of leader behavior. Subsequently, the two latter elements were withdrawn leaving the now familiar "initiating structure" and "consideration" as the two major dimensions of leadership behavior.

The initiating structure and consideration dimensions fit the same general pattern as do the concepts of employee orientation and production orientation, which were the fruits of the studies at the University of Michigan (1951). Among the leading Michigan researchers were Katz and Kahn (1951) and Likert (1961). Likert, drawing upon the findings of the Survey Research Center and the Research Center for Group Dynamics, described five conditions for effective supervisory behavior: (1) supportive relations, (2) group methods, (3) high performance goals, (4) technical knowledge, and (5) coordinating, scheduling, planning.

Synthesizing the findings of Likert, as well as those of the earlier behaviorist writers, Bowers and Seashore (1966) developed the Four-Factor Theory of leadership which served as the construct of leadership used in the present study. Bowers and Seashore postulated that four dimensions of leadership behavior are needed to

provide effective leadership in an organizational setting. The four factors identified by Bowers and Seashore were:

(1) Support--behavior that enhances someone else's feelings of personal worth and importance.

(2) Interaction facilitation--behavior that encourages members of the group to develop close, mutually satisfying relationships.

(3) Goal emphasis--behavior that stimulates an enthusiasm for meeting the group's goals or achieving excellent performance.

(4) Work facilitation--behavior that helps achieve goal attainment by such activities as scheduling, coordinating, planning, and by providing resources such as tools, materials, and technical knowledge.

The Four-Factor theory was first validated in a study of insurance agencies, and later was tested in an educational setting by Mendenhall (1976). However, the present study is believed to be the first attempt to use the theory to relate the leader behavior of school principals to student outcomes in the school.

Recent Developments in Leadership Theory

In recent years, the focus of researchers and theorists concerned with leadership has been on integrating the situational and behavioral approaches discussed above. The "modern" theorists have tried to relate the elements of the LBDQ to intermediate and situational variables which tend to mediate the relationship between leader behavior and organizational outcomes.

A second preoccupation of present-day leadership scholars has been the concept of effectiveness or productivity in organizations.

These writers have been interested in determining those leadership characteristics which facilitate effectiveness of organizational outcomes under prevailing conditions. Yukl (1971), for example, developed and tested a "multiple linkage" model of leadership behavior to explain how the leader behavior variables as measured by the LBDQ interact with situational variables to determine group productivity. In Yukl's model, consideration and initiating structure (the leadership behavior variables) interact with "decision-centralization" (intermediate-situational variables) in explaining productivity.

House and Mitchell (1974) espoused a "path-goal" theory of leader behavior which stated that leaders are effective because of their impact on subordinates' motivation and ability to perform effectively and also their satisfactions. Nebeker and Mitchell (1974) took an "expectancy theory" approach to the explanation of leader behavior as related to organizational goals. According to Nebeker and Mitchell, an individual's behavior can be predicted from (a) the perceived expectation that a behavior is related to the attainment of outcomes weighted by (b) the evaluation of these outcomes. More specifically, these authors argued that leader behavior (e.g., consideration and initiating structure) facilitates or blocks the attempts of subordinates to obtain their own work related goals. This expectancy theory of leader behavior has been tested in "real life" situations with some success.

Criteria for Assessing Leadership Theory

This study has portrayed the development of leadership as evolving from a concern for the person endowed with superhuman qualities, to the traits of persons, to traits of persons interacting with others in a situation, to focusing on the behaviors of leaders as perceived by followers. It has been suggested here that the great man and the traitist approaches to leadership have proven fruitless in describing leadership. The two remaining approaches which have been used extensively in industrial, military, and to a lesser extent, educational settings, will be evaluated at this point.

How does the behavioral leadership construct used in the present study compare with constructs representing the situational approach to leadership? Lipham (1973) has developed a set of criteria against which leadership theory and research may be evaluated. The criteria proposed by Lipham include: (1) complexity, (2) clarity, (3) vitality, (4) generality, and (5) utility. Each of these will be discussed briefly followed by a general assessment of the leadership approaches discussed earlier using the five criteria.

Complexity. Complexity refers to the number or relationship of the variables posited. The complexity criterion requires that interrelationships among variables be fully explored. More specifically, theoretical work on leadership should focus on the interactive nature of the variables postulated. Research should show

concern for whether or not the relationships between variables posited as linear are actually curvilinear in nature.

The behavioral approach to leadership suffers somewhat with respect to the complexity criterion. According to this approach, leadership is a transaction between leaders and followers (Moser, 1957; Hemphill, 1957; Brown, 1966). Usually, the only variables involved are the two subscales of the leadership variable (consideration and initiating structure), and a criterion variable. The Four-Factor theory used in the present study compensates for the lack of complexity somewhat in that it describes leadership in four dimensions as opposed to the traditional two dimensions.

The situational approach, on the other hand, does not suffer from a lack of complexity. Not only are leader and criterion variables posited; they are mediated by a host of intervening and contingent variables which impinge upon the relationships posited. Following the lead of Fiedler, the more recent situationalists have included variables derived from expectancy and discrepancy theory as mediating the relationships between leaders, followers, and organizational outcomes.

Clarity. The three main concerns of the clarity criterion are exactness, precision, and operationality. The characterization of concepts and methodology in theory and research must be explicit. The behavioral approach stands out from other approaches as concerns the clarity criterion primarily because of the operational

definitions of leadership provided by behaviorist researchers. The work of the Ohio State Leadership Studies group (Halpin and Winer, 1951; Hemphill and Coons, 1951) resulting in the LBDQ and its subsequent expansion by Stogdill (1963) resulting in the LBDQ-12, and finally, Bowers and Seashore's Four-Factors (1966) have paved the way for a more scientific approach to the study of leader behavior.

If there is a link between the behaviorists and the situationists it manifests itself in the operationl definition of leadership to which the two camps subscribe. The neo-situationist-behaviorists have essentially rejected the Least Preferred Co-Worker scale (LPC) championed by Fiedler as a reasonable instrument for measuring leader behavior. This instrument has been criticized as being a measurement of leader attitudes rather than leader behavior. Consequently, the situationist researchers have opted for LBDQ-type instruments for measuring leadership constructs included in their studies (Yukl, 1971; House and Mitchell, 1974; Nebeker and Mitchell, 1974).

Vitality. Vitality refers to the degree to which theory or research can be characterized as heuristic, powerful, or dynamic. From a theoretical perspective, one would be concerned about the ability of the approach to generate hypotheses. From a research point of view, one would consider whether or not the approach lends itself more readily to the study of longitudinal or cross-sectional situations. The paucity of longitudinal studies in educational research has long been decried (Greenfield, 1967). All of the

approaches appear to fall short of meeting this criterion. The LBDQ, for all its strengths, has been criticized severely on the grounds that it provides only a snapshot of leader behavior at a point in time. The implication is that leader behavior is apt to change from situation to situation.

Generality. The criterion of generality considers the nature and range of organizational or individual situations encompassed by the theory or research. The situations studied can range from broad to narrow or from macroscopic to microscopic in nature. This criterion has grave implications for the generalizability of findings obtained in research on leadership. The LBDQ-type studies appear to be generalizable to educational settings since the instrument has been used extensively in education through the work of the Ohio State and Michigan leadership groups, and more recently by a Canadian group (Andrews, 1963; Keeler, 1963; Greenfield, 1967).

Generally speaking, situational studies have not appeared extensively in school settings. Although studies by Singe (1974) and Blanchard (1978) are notable exceptions to this rule, situational studies have appeared in industrial and military settings more so than in the educational arena (House and Mitchell, 1974: Hill, 1969; Wearing, 1974).

Utility. The utility criterion examines the stance taken with regard to advocacy versus inquiry concerning the relationality, causality, and intervention capacity of variables posited. This

stance is discernible from statements made concerning correlation, as opposed to causality, in the relationships that are found to exist. At this point, virtually all of the approaches to leadership take the inquiry/correlational stance. The utility criterion is very important in theory and research on leadership because of its potential for specifying links between outcomes and productivity stemming from leadership behavior.

In summary, it would appear that the behavioral approach to leadership, of which the Four-Factor theory is a part, is superior to the situational approach in terms of the criteria of clarity, vitality, and generality, especially with regard to their usefulness in educational settings. The situationalist approach is clearly more advanced with respect to the criterion of complexity. Overall, the behavioral construct used in the present study would seem to have merit as a tool for the study of the effects of leadership in school settings.

The Principal in Individually Guided Education

Individually Guided Education (IGE) is emerging as a viable alternative system of elementary schooling in this country. Conceptually, IGE is viewed as a "comprehensive alternative form of schooling designed to produce higher educational achievements through providing well for differences among students in rate of learning, learning style, and other characteristics" (Klausmeier, 1971). The

IGE system offers a major alternative to the age-graded, self-contained classroom form of schooling at the elementary level. The comprehensive IGE system consists of seven major components: (1) the multiunit school--a model for organizational-administrative arrangements; (2) a model of instructional programming; (3) a model for measurement and evaluation; (4) appropriate curriculum materials and instructional procedures; (5) a program of home-school-community relations; (6) a network of facilitative environments; and (7) continuing research and development.

The IGE approach prescribes specific roles for the principal in each of the seven components. Of these seven, the multiunit elementary school (MUS-E) component appears to be of the most direct relevance for the role of the principal in the educational process. The MUS-E is organized along three hierarchical levels of operation: (1) the Instructional and Research (I and R) unit at the instructional level; (2) the Instructional Improvement Committee (IIC) at the school level; and (3) the Systemwide Program Committee (SPC) at the district level. It is through the IIC that the principal assumes greater and more direct responsibility for the improvement of instruction. Lipham and Fruth (1976) have given the following account of the principal's role in the IIC:

> The principal organizes and leads the IIC which serves as a vehicle for open communication and systematic planning. The principal assists the committee in making decisions which can be implemented effectively. The principal selects, assigns, and orients the staff members to their differentiated

> roles and encourages each person to participate in a meaningful program of professional growth and development (p. 3).

In the role of chairperson of the IIC, the principal takes the lead in planning and coordinating activities related to instruction. In this capacity, the principal has the opportunity to set the pace in formulating schoolwide educational objectives for pupils in the attendance unit. The principal, then, obviously is in a position to leave an imprint on the instructional program offered to students.

For the purposes of this study, it was necessary to establish that the principal has an instructional role. This is not to denigrate the managerial role of the principal, for in the IGE setting there is still much to be done by the principal in the areas of fiscal management, public relations, and legal matters.

The IGE principal has been the topic of a number of studies conducted at the Wisconsin Research and Development Center. All of these studies have focused on the leadership aspect of the principal's role and its relationship to some measure of organizational effectiveness at the I and R unit, IIC, and schoolwide levels. These studies will be reviewed in chronological order.

Smith (1972), using a sample of 36 IGE schools in Colorado and Wisconsin, studied the relationship between leader-member compatibility and IIC effectiveness. This study revealed a positive relationship between leader consideration behavior and IIC effectiveness. Gramenz (1974) was interested in principal leader

behavior in relation to I and R unit effectiveness. Effectiveness was operationalized as the degree to which unit teachers rated their units as being effective with regard to instructional program, staff development, organizational operations, and school-community relations. Instrumental, participative, and supportive leadership by the principal were found to be positively related to effectiveness of the I and R unit. Mendenhall (1976) used schoolwide teacher job satisfaction as the dependent variable and found a strong positive relationship between the principal's leader behavior and job satisfaction of teachers.

All of the above studies found principal leader behavior to be related to organizational effectiveness. However, in none of these studies was an attempt made to link principal-related variables to student outcomes. The present study sought to establish this missing link.

The Principal and Pupil Outcomes

The principal has long been suspected of influencing pupil outcomes but has never been "caught in the act." That is, the nature of the principal's role as it related to pupil outcomes in the schooling process has yet to be clarified. Earlier in this chapter a case was made for the principal's ability to impact on the educational process. The principal was shown as affecting educational outcomes via his or her role as educational leader. It is

the aim of the following sections to speculate as to the specific nature of the principal's link to learning in the school.

The obvious question which arises at this point is, "How can the principal influence the learning process and ensuing outcomes of pupils when he or she does not teach?" Fifty years ago, the epitome of a good principal was one who could take over a teacher's class "and teach it well" (Cubberley, p. 24). Today, except in the case of a few "innovative" schools, this situation would not be apt to occur. The principal would be too preoccupied with the managerial and operational activities of the school to make time for classroom teaching. Furthermore, union contracts and restrictions might prohibit the principal from entering the classroom even if time were not a problem.

In answer to the question posed at the beginning of this section, then, it is postulated that the principal may affect the cognitive and affective outcomes of pupils in at least three ways: (1) directly, (2) indirectly through teachers, and (3) indirectly through the school climate. The remainder of this chapter will be devoted to a discussion of these three possible ways in which the principal may affect student outcomes.

The Direct Influence of the Principal

If a pupil were asked, "Was the principal present the last time you experienced learning?" the answer would probably be "No!" For all the planning of curriculum, leadership, shared decision

making, and innovative techniques associated with the principal through membership on the IIC, the principal still does not interact directly with pupils in teacher-learning situations. It is thus doubtful that the principal exerts a direct influence on the learning of pupils. In fact, one may further speculate that any direct influence of the principal would be related to pupil affective outcomes.

There is little in the way of empirical research to either support or refute the direct influence argument. Keeler and Andrews (1963), in studying the relationship between principal leader behavior, teacher morale, and pupil growth, found the principal's goal-oriented behavior to exhibit a stronger relationship to the criterion variable than did the principal's idiographic behavior. Their finding that the relationship between the principal's leader behavior and student achievement was not mediated by teacher morale supports the direct argument. The hypothesis generated from observations on the direct influence of the principal on student outcomes can be stated thus:

> There is no relationship between principal leader behavior and student self-concept.

The Mediated Influence of the Principal

Despite the findings of Keeler and Andrews, the conventional wisdom would indicate that any relationship posited between principal leadership and student outcomes must surely be mediated by other

variables. Dubin (1968), who postulated a leadership-productivity linkage mediated by morale, gave the following explanation for this line of thinking:

> In each instance, the intervening variable is measured against some measure of leadership behavior. However, it is then assumed, without direct measurement in almost all instances, that positive values of the intervening variables are associated with positive high values of the productivity variable. This assumed second-step relationship without its empirical demonstration is what makes it so difficult to establish a direct and verified connection between leadership behavior and the productivity of those being led (p. 449).

The mediated influence argument helps clear up the problems centering around the fact that pupils, unlike factory workers or even teachers, are not the direct subordinates of principals. Some kind of link between the principal and students, then, would seem to be in order. Moser (1957), in a study of leadership patterns of principals and superintendents, commented:

> . . . the ultimate criterion of organizational effectiveness is the quality of learning which results from children's experience in school. The school principal is one step removed from the immediate classroom, but his behavior in interaction with the teachers is of key importance in determining the quality of educational experience that takes place in the school (p. 1).

An empirical study by Gross and Herriot (1965) sheds some light on the mediated influence position. In a study of 152 schools in 39 cities, the authors looked at a host of variables associated with staff leadership in the schools in relation to school outcomes. The authors concluded that "both teachers' professional performance

and morale may serve as links in a causal chain between the Executive Professional Leadership (EPL) of principals and the performance of their pupils" (p. 57). Their conclusion was based on the fact that the initial partial correlation coefficient of .25 between the EPL score and the Pupil Performance score diminished to .13 and .05, respectively, when the Teacher Professional Performance and Teacher Morale scores were removed from the analysis. In the present study, the variable representing the mediating influence of teachers is Teacher Job Satisfaction.

Based on the mediated influence argument, a second hypothesis can be stated as follows:

> The relationship between principal leader behavior and student cognitive outcomes is mediated by teacher job satisfaction.

School Climate

A final possibility recognized in this study is that perhaps the manner in which the principal influences the school climate is the medium through which he or she impacts on the learning of pupils. The school climate may be defined as the physical ambiance or "personality" of the school. The school climate is related to the principal's leadership and managerial functions, the latter being reflected in this study by the principals' use of non-instructional time. Mitchell (1972) observed that:

> The principals are both the de facto and de jure managers of the entire enterprise. The system of public education is such a large operation that it

> is extremely difficult to fasten on a point of entry to attain improvement. But standing as he does at the schoolhouse door, the principal is easily identifiable as the key determiner of climate in the school (p. 13).

Miller (1976), in a synthesis of literature and studies on administrative behavior and school productivity, found a link between reading achievement and administrative policies, behavior, procedures, and practices. He further postulated that improving the skills of the principal and the organizational climate of the school might have a significant payoff in student growth (p. 337). Brown (1967) warned, however, that leadership merely facilitates the process of the organization, not its product. Miller conceded this point, commenting that the explanation lies in organizational, not educational, terms. According to Miller, "Good leadership, like other healthy organizational dynamics, enhances the probability of institutional policies being successfully implemented" (p. 338).

The variable representing school climate in the present study is school size. The size of the school has implications for the quality and frequency of interactions between the principal and the teaching staff in planning and implementing of the instructional program. The hypothesis flowing from the school climate view can be stated as follows:

> The principal's leadership is an intervening variable between school climate variables and student outcomes.

Summary

The purpose of this chapter was to determine the nature of the principal's role in the educational production process relative to student cognitive and affective outcomes of pupils. It was assumed that the key to the role of the principal was to be found in the principal's performance of the function of educational leader. Traditional approaches to the study of leadership were discussed and evaluated in order to discover that kind of leadership which is associated with effectiveness of school outcomes. The Four-Factor theory, from which the leadership construct used in the present study was taken, was found to rate well with respect to clarity. generality, and utility. Since the sample of principals used in this study was drawn from IGE schools, it was necessary to examine the role of the principal in the IGE system. It was suggested that the leadership role of the principal was facilitated by the IIC. Finally, it was speculated that there were at least three methods by which the principal could influence the learning of pupils: directly, indirectly through teachers, and indirectly through school climate. Hypotheses were generated for each of these possibilities.

CHAPTER III

DESIGN AND METHODOLOGY OF THE STUDY

The present study was an exercise in secondary analysis in that old data were used to answer new questions. This study involved an analysis and synthesis of data obtained from IGE schools during the 1975-76 school year. During this period the Organization and Administrative Arrangements and the Cost-Effectiveness work groups of the Wisconsin Research and Development Center conducted a major study involving a national sample of IGE schools. Previous studies reporting the results of this effort have examined data concerning student self-concept, student achievement, organizational structure, decision involvement, job satisfaction, and leader behavior (Bocian, 1976; Feldman, 1976; Sigurdson, 1976; Mendenhall, 1976). In addition, data on expenditures for instruction and on the allocation of time by teachers and principals in IGE and non-IGE schools were examined (Rossmiller & Geske, 1977).

Portions of this data base were utilized for an analysis of the principal's production function in IGE schools and the results have been summarized in this report. This chapter will delineate the design and methodology of the present study. Included in this chapter are a description of the population and sample selection procedures, the instruments and techniques employed in gathering

data, and the statistical techniques used in estimating the model of the principal's production function.

Design of the Study

The design of the research study can be described as the overall plan of the study. According to Kerlinger (1973) the research design, not unlike the architect's blueprint, serves as a guide which imposes "controlled restrictions on observations of natural phenomena" (p. 327). The research design depends upon the nature of the questions to be answered and the availability of research data. The present study was categorized as a field study. Kerlinger defined field studies as "ex post facto scientific inquiries aimed at discovering the relations and interactions among sociological, psychological, and educational variables in real social structures" (p. 405).

Two important characteristics of field studies rendered the use of the multivariate design an appropriate one for the present study. First, behavioral research suggests that a large number of independent variables will be studied. Second, the fact that field studies are ex post facto in nature suggests that variables are not under the direct control of the investigator since subjects cannot be manipulated and randomly assigned to particular experimental treatments.

Population and Sample Selection

The sample used in this study consisted of a subsample of schools from which data were gathered in 1975-76. The Research and Development Center's Multiunit Elementary School Directory for 1973-74 was used to identify 959 schools that had used the IGE system for at least two years. Of these schools, 20 percent were located in urban areas and 80 percent in suburban and rural areas. The schools were classified as "city" and "other," with the former category including schools located in urban places with a population of at least 200,000 and the latter group including those schools in locales with a population under 200,000 in 1970. A stratified random sample was drawn and a telephone survey was conducted to solicit additional information from the schools and to seek their agreement to participate in the study.

The telephone interview schedule was designed to determine whether or not a school met the following minimal criteria established for participation in the study:

1. The entire school conformed to the multiunit organizational pattern;
2. The school utilized multiaged grouping in each of its I & R Units;
3. The instructional programming model had been in use for at least two years in reading and for at least one year in mathematics;

4. The school's I & R Units met at least once a week, and its instructional improvement committee met at least twice per month;
5. The unit leader was not new to the selected I & R Unit, nor were more than one-half of the teachers new to the selected unit.

A sample consisting of 41 schools from 13 states was obtained by calling in order the randomly selected schools in each group. Approximately 100 schools classified as "other" were called to obtain 33 schools, and 50 "city" schools were called to obtain eight urban schools. Within each of the schools chosen one intermediate I & R Unit in which the data concerning students and staff were to be gathered was randomly chosen. For the present study, the data provided by 28 of the original 41 schools were sufficiently complete for inclusion in the analysis.

Data Collection

One intermediate unit in each school was designated for gathering data on randomly selected pupils and school personnel. Within each intermediate unit, one-third of the children were randomly assigned to take the Self-Observation Scales--a measure of student affective behavior. Another one-third were assigned to a mathematics achievement test; and a final third took a reading achievement test. A total of 41 principals, 41 unit leaders, 138 teachers, and 1,409 pupils participated in the original 1975-76

study. Information pertinent to the present study was retrieved from the data file, BIGDATAMAT (McIsaac, 1976), which contained the average school scores for 28 of the original 41 principals.

Instrumentation

Seven instruments taken from the five companion studies mentioned above provided the data for this analysis. These instruments included (1) the Principal Leadership Assessment questionnaire (PLA) taken from Mendenhall; (2) the Comprehensive Tests of Basic Skills (CTBS) taken from Sigurdson; (3) the Principal/Teacher Background Information questionnaire taken from Mendenhall; (4) the Time Allocation of Instructional Personnel taken from Rossmiller and Geske; (5) the School Expenditure Data taken from Rossmiller and Geske; (6) the Self-Observation Scales taken from Bocian, and (7) the Teacher Job Satisfaction Survey taken from Mendenhall. These instruments are included in Appendices A to G. A brief discussion of each instrument follows.

The Principal Leadership Assessment Questionnaire. The Principal Leadership Assessment questionnaire (PLA) was designed to determine the nature of the principal's leadership as perceived by teachers and was first used in an IGE school setting by Mendenhall (1977). The PLA was developed by Bowers (1966) and was adapted from the Survey of Organizations Questionnaire from the Institute of Social Research, University of Michigan Organizational Development Research Program. The instrument has been tested for internal

consistency and reliability in nonschool settings and was proven valid and reliable. In the present study, the PLA was intended to measure the facilitative leader behavior of principals. The four subscales of the instrument are:

Scale I--Support

1. ...friendly and easy to approach?
2. ...attentive to what you say?
3. ...willing to listen to what you say?

Scale II--Goal Emphasis

1. ...encourage people to give their best efforts?
2. ...maintain high standards of performance?

Scale III--Work Facilitation

1. ...show you how to improve your performance?
2. ...provide the help you need so that you can schedule your work ahead of time?
3. ...offer new ideas for solving job-related problems?

Scale IV--Interaction Facilitation

1. ...encourage persons who work with him/her to work as a team?
2. ...encourage people who work with him/her to exchange opinions and ideas?

Comprehensive Tests of Basic Skills. The Comprehensive Tests of Basic Skills, Expanded Edition (CTB/McGraw-Hill, 1974) is a series of test batteries for kindergarten through grade twelve. This study used the Reading and Mathematics sections of the Level 2 battery. The Reading and Mathematics tests were administered to respective random thirds of the pupils in the sample. This test has been found to score high on reliability and validity, as has been reported in CTB/McGraw-Hill (1974).

Principal/Teacher Background Information. This instrument was developed by the R3 component of the Research and Development Center. The instrument was used to gather data on the educational level, experience, and professional activities of IGE principals and teachers.

Time Allocation of Instructional Personnel. The Time Allocation instrument was developed by the Cost-Effectiveness project staff of the Research and Development Center to measure the way in which IGE principals and teachers spend their time. Direct instructional time was partitioned into the amount of time spent per week on direct versus indirect instructional activities. This instrument also was filled out by aides, interns, secretaries, and other certificated personnel.

School Expenditure Data. This instrument was developed by the Cost-Effectiveness project to collect data on school human and material resources and the internal allocation of expenditures.

Self-Observation Scales (SOS). The Intermediate Level of the Self-Observation Scales (SOS) developed by Katzenmeyer and Stenner (1973) is a direct, self-report, group administered instrument comprised of 60 items that measure seven areas of student affective behavior in grades four through six. The seven domains are: self-acceptance, self-security, social maturity, social confidence, school affiliation, teacher affiliation, and peer affiliation. One-third of the pupils in the sample were administered the SOS. The validity

and reliability of this instrument have been reported in Katzenmeyer and Stenner (197[illegible]).

Job Satisfaction Survey. This instrument was used to determine the nature of teachers' and principals' satisfaction with various aspects of their job. The instrument was adapted from the Survey of Organizations questionnaire by R3 researchers by including two scales pertaining to satisfaction in the school setting. Responses took the form of a t point scale ranging from "not satisfied" to "very satisfied." Information on the validity and reliability of the instrument is reported in Mendenhall (1977).

Data Analysis (Model Estimation)

Determining the parameters of the functional form of the production function is called estimating the model. Generally, determining the functional form is treated as an empirical question. It is postulated that the basic model to be estimated in the present study is of linear functional form. Pearson Product-Moment correlations and stepwise multiple regression were used to estimate the regression coefficients. The variables to be estimated in the model are presented below:

(1) Student Outcome Variables. The student outcome variables are the dependent variables of the study and include both cognitive and affective outcomes.

(a) Student Achievement Variables. The reading achievement subscales include reading vocabulary, reading comprehension, and total reading. The mathematics achievement subscales include mathematics, computation,

mathematics concepts, mathematics applications, and total mathematics.

(b) Student Affective Behavior Variables. Affective behavior is measured as self-concept by seven subscales of the Self-Observation Scales: self-acceptance, self-security, social maturity, social confidence, school affiliation, teacher affiliation, and peer affiliation.

The three sets of independent variables associated with the principal include:

(2) Principal Leadership Variables. Principal's leadership as perceived by teachers is measured by principal's support, goal emphasis, work facilitation, and interaction facilitation.

(3) Principal Background Variables. The principal background variables are measured by twenty questions reflecting personal characteristics and human capital accumulation of the principal such as experience and education levels and professional activities in IGE settings; age; and sex.

(4) Principal's Utilization of Time Variables. These variables include the principal's instructional time and the principal's noninstructional time (planning, supervision, record-keeping, clerical, inservice, testing, administrative, and other activities).

Correlation Analysis

Correlation analysis played a multipurpose role in estimating the production function. First, it tested the first hypotheses to determine whether or not a relationship existed among the variables under study. Pearson Product-Moment correlations were calculated for the matrix of independent variables against the dependent variables to determine the strength of the relationship between variables (see Appendix H). Those relationships which were statistically

significant at the .10 level or better were selected for use in the production function equation. This procedure is discussed further in the following chapter.

Multiple Regression Analysis

Multiple regression techniques are most often used in estimating models of the educational production process. Essentially, multiple regression permits the empirical testing of specified relationships between variables by isolating the separate effects of different variables entered into the equation. Classic least squares has been found to be the most common estimation technique in the production function literature. According to Johnston (1963), least squares estimators are "best linear unbiased, that is, that of the class of linear unbiased estimators, the least-squares estimators have the smallest variance" (p. 16). The least-squares technique estimates effects of the independent variables on the dependent variable simultaneously, taking into account the effects of the other independent variables on the dependent variable. In effect, this procedure permits the study of any one of a group of independent variables while all others are held constant.

The present study employed a stepwise multiple regression procedure. According to this procedure, variables were "stepped out of" (or deleted from) the regression equation one at a time depending on whether or not they made a significant contribution to the explanatory power of the equation. A major problem associated with

the use of stepwise regression techniques is multicollinearity resulting from high intercorrelations among independent variables used in the regression equation. In the present study, care was taken to avoid the problem of multicollinearity by entering sets of independent variables with intercorrelations below .500. The regression equations used to estimate a model of the principal's production function are presented in the following chapter.

Path Analysis

The final statistical technique used in this study was path analysis. Because the exact nature of the principal's role in the production of education is speculative, it was not enough simply to isolate those variables associated with the principal. It was necessary to go a step further and explore the possibilities by which these variables might affect school outcomes. Path analytic techniques require explicit assumptions about causal relationships which are then decomposed and interpreted in terms of direct and indirect effects. According to Nie et al. (1975), path analysis is not a procedure for demonstrating causality. Rather, "it is a method for tracing out the implications of a set of causal assumptions which the researcher is willing to impose upon a system of relationships" (p. 389). A path diagram linking principal related variables with student cognitive outcomes are included in the following chapter.

CHAPTER IV

ANALYSIS OF THE DATA

This chapter summarizes the results of the data analyses performed in the study. Specifically, this chapter discusses the statistical techniques and procedures used to analyze the data collected to answer questions concerning the role of the principal in the educational production process in IGE schools. The overriding research question to be answered, as stated in Chapter I, is restated here:

> Which of the variables associated with the principal contribute most to the explained variance in student cognitive and affective outcomes in IGE schools?

This question was answered in three steps. First, hypotheses were generated and tested for statistical significance using Pearson Product-Moment correlations. Second, those variables exhibiting significant correlation coefficients were used to estimate production functions for the principal in reading, mathematics, and student self-concept using backward stepwise multiple regression techniques. Finally, path analysis procedures were used to test three additional hypotheses concerning the nature of the relationship between principal related variables and student outcomes.

Pearson Product-Moment Correlations

Pearson Product-Moment correlations were calculated for the 44 variables available for use in this study. A correlation matrix was computed for the entire set of variables in order to determine their intercorrelations and also to look at the relationships between the independent and dependent variables to be subsequently used in estimating the principal's production function (see Appendix I). Ideally, variables used in estimating the model would exhibit high correlations between independent and dependent variables but low intercorrelations among the set of independent variables.

For the present study, the principal related variables which exhibited a relationship statistically significant at the .10 level with any of the student cognitive and affective criterion variables were selected for inclusion into regression equations. These variables are shown in Table 2.

Production Functions for Self-Concept, Reading, and Mathematics

Multiple regression techniques are considered to be of value in the manipulation of variables in school settings. Theoretically, multiple regression analysis makes it possible to obtain unbiased estimates of the effects of school resources on student outcomes. However, as with most issues surrounding the educational process, there exists some controversy as to the applicability of regression

TABLE 2

CORRELATIONS BETWEEN SELECTED INDEPENDENT AND DEPENDENT VARIABLES SIGNIFICANT AT THE .10 LEVEL

Independent Variables	Dependent Variables (and Significance Level of Correlation)		
PBIQ5 (Sex)	Vocab (.072)	Read (.067)	Compreh (.070)
PBIQ6 (Participation in IGE staff development workshop)	Accept (.084)		
PBIQ10 (Years in an IGE school)	Math Appl (.046)		
PBIQ11 (Number of district committees serving on)	Schlaff1 (.050)		
PNON (Principal's noninstructional time)	Schlaff1 (.022)		
PBIQ13 (Number of professional meetings attended each year)	Confident (.056)	Peer Aff1 (.074)	
INTRFAC (Interaction facilitation)	Security (.073)		
GOAL (Goal emphasis)	Math Comp (.063)		

techniques to educational problems. First, regression analysis assumes a linear model of the educational process and one must recognize the possibility that some of the interactions in the educational process may be nonlinear in nature. Second, to fulfill the requirements of production function analysis, regression analysis must show the marginal effects of increasing amounts of one variable upon the outcome variable. According to Michelson (1970),

> The linear equations presented here and elsewhere should not pretend to do this. They perform, rather, an averaging function. They designate what the linearly isolated effect of a particular variable seems to be; at least, what the linearly isolated association of an independent variable with the dependent variable is over a large number of observations (p. 133).

Other assumptions of multiple regression analysis include homogeneity of variance, and low intercorrelation of independent variables used in the equation. Further, it was necessary that these assumptions be in harmony with the rules of model specification discussed earlier. The analyses which follow were performed with these assumptions in mind.

The backward stepwise regression procedure yielded three sets of data: the initial equation containing the original set of independent variables regressed against the selected dependent variable; the summary of steps by which the variables contributing least to the explained variance in the dependent variable were removed from the equation; and the final equation. For the sake of parsimony, only the initial and final equations are presented in

the body of the chapter. The summary of steps can be found in Appendix J. A significance criterion of .10 was established to determine whether a variable would leave the equation. All analyses were performed at the Academic Computing Center of the University of Wisconsin-Madison using the REGAN 3 program (1978).

Student Self-Concept Equations

Development of a healthy self-concept in students is regarded by many as a very important aim of the educational system. LaBenne and Green (1969) defined self-concept as "the person's total appraisal of his appearance, background and origins, abilities and resources, attitudes and feelings which culminate as a directing force in behavior" (p. 10). It was postulated in this study that the principal impacts upon affective outcomes of pupils as represented by self-concept variables just as he or she influences cognitive outputs of pupils.

The student self-concept construct employed in this study was taken from Bocian (1976). The variable was measured using the Self-Observation Scales developed by Katzenmeyer and Stenner (1975). The Intermediate Level of the Self-Observation Scales (SOS) is a self-report instrument containing 60 items measuring seven areas of student affective behavior in grades four through six. The seven domains include: (1) Self-Acceptance, (2) Self-Security, (3) Social Maturity, (4) Social Confidence, (5) School Affiliation, (6) Teacher Affiliation, and (7) Peer Affiliation. Each of these seven domains was tested against principal-related independent variables.

The Principal and Self-Acceptance. According to the SOS, children scoring high on Self-Acceptance have an overall positive attitude about themselves and attribute to themselves qualities of happiness, importance, and general competence. They see themselves as being valued by their peers, family, and teachers. Children scoring low on Self-Acceptance have opposite views of themselves. Tables 3 and 4 present the findings of the regression of selected principal related variables on student Self-Acceptance.

The variables entering the regression equation were PBIQ6 (IGE staff development workshop participation), PBIQ17 (time spent in planning and coordinating unit activities per week), PNON (principal's total noninstructional time per week), and INTRFAC (principal's score on interaction facilitation). These variables taken together produced a coefficient of multiple correlation of .5234, accounting for over 27 percent of the variance in student Self-Acceptance, as shown in Table 3. The variables contributing most to the variance in the criterion variable were INTRFAC (.327) and PBIQ6 (.315), but they were not statistically significant at the .10 level. The remaining variables, PBIQ17 (-.197) and PNON (-.281) showed a negative partial correlation with student Self-Acceptance.

The sole variable remaining in the final equation was PBIQ6, as shown in Table 4. This variable alone accounted for 11 percent of the variance in student Self-Acceptance and had a significance level of .08. Table J-1 in the Appendix illustrates the sequence

TABLE 3

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON SELF-ACCEPTANCE

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 23 d.f.)	Observed Sig. Level
PBIQ6	.2893	.315	2.53256	.1252
PBIQ17	-.1715	-.197	.92429	.3463
PNON	-.2559	-.281	1.96576	.1743
INTRFAC	.2956	.327	2.75573	.1105

DEPENDENT CONSTANT = 4405.428

R = .5234

R^2 = .2740

F-Ratio = 2.17 (with 4 and 23 d.f.)

Significance level = .1045

TABLE 4

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SELF-ACCEPTANCE

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ6	.3327	.333	3.23673	.0836

DEPENDENT CONSTANT = 4730.2

R = .3327

R^2 = .1107

F-Ratio - 3.24 (with 1 and 26 d.f.)

Signiiicance level = .0836

of steps which brought about the removal from the equation of variables which had little impact on the criterion, Self-Acceptance. PBIQ17 was the first to be removed, followed by PNON and INTRFAC, respectively.

The Principal and Self-Security. Self-Security measures the level of emotional confidence or stability of children. Pupils scoring high on Self-Security feel that they are in reasonable control of the factors that affect their lives and worry little about possible troubles. Table 5 lists the variables associated with the principal which were regressed against Self-Security. These variables included INTRFAC and PNON, which were used in the regression of principal related variables on Self-Acceptance, and three other variables, PBIQ5 (sex), GOAL (goal emphasis of the principal), and PBIQ13 (number of meetings of professional organizations attended each year). As a group, these five variables produced a multiple correlation coefficient of .6588 and accounted for over 43 percent of the variation in student Self-Security. The leadership variables, INTRFAC and GOAL showed partial correlation coefficients of .609 and -.529, respectively. Collectively, the five variables generated an F-ratio of 3.37 and a statistical significance level of .02.

Using the backward stepwise regression procedure, variables contributing least to the variation in student Self-Security were the first ones stepped out of the equation, as illustrated in Table J-2 in the Appendix. These variables were PNON, PBIQ5, and

TABLE 5

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SELF-SECURITY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.7803	.609	12.97310	.0016
PNON	.0104	.014	.00403	.9500
PBIQ5	-.0522	-.068	-.31935	.7525
GOAL	-.6418	-.529	8.52965	.0079
PBIQ13	-.2209	-.269	1.72036	.2032

DEPENDENT CONSTANT = 4666.7500

R = .6588

R^2 = .4340

F-Ratio = 3.37 (with 5 and 22 d.f.)

Significance level = .0206

PBIQ13, respectively. As shown in Table 6, only the two variables associated with the principal's leadership as perceived by teachers were retained in the final equation. The variables INTRFAC and GOAL, taken together, explained approximately 40 percent of the variance in students' Self-Security. The partial correlation of GOAL was negative. The two variables yielded an F-ratio of 7.95, which was statistically significant at the .002 level.

The Principal and Social Confidence. Social Confidence concerns the ability of students to relate successfully to others in social situations. Students with high scores on Social confidence feel they can make friends easily and that they are valued and enjoyed by their friends. On the other hand, children with low scores on Social Confidence have difficulty making friends and do not feel valued by others. Table 7 reveals that the same set of variables used in the preceding equation were presented in the Social Confidence equation. Again, the leadership variables, INTRFAC (.418) and GOAL (-.343), along with PBIQ13 (-.324) displayed the highest partial correlations. However, this set of variables contributed considerably less to the explained variance in Social Confidence, .2939, as opposed to .3887 in the case of Self-Security.

Table 8 shows that, in addition to INTRFAC and Goal which were both retained in the equation where Self-Security was the criterion, PBIQ13 also remained in the equation. PBIQ13, as in the case of GOAL, showed a negative partial correlation with Social

TABLE 6

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SELF-SECURITY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 25 d.f.)	Observed Sig. Level
INTRFAC	.8088	.611	14.86704	.0007
GOAL	-.6976	-.554	11.06050	.0027

DEPENDENT CONSTANT = 4589.8

R = .6234

R^2 = .3887

F Ratio = 7.95 (with 2 and 25 d.f.)

Significance level = .0021

TABLE 7

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SOCIAL CONFIDENCE

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.5226	.418	4.66469	.0420
PNON	.0066	.008	.00131	.9715
PBIQ5	.1032	.120	.31930	.5778
GOAL	-.4198	-.343	2.92433	.1013
PBIQ13	-.3025	-.324	2.58705	.1220

DEPENDENT CONSTANT = 4980.6157

R = .5421

R^2 = .2939

F-Ratio = 1.83 (with 5 and 22 d.f.)

Significance level = .1481

TABLE 8

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON SOCIAL CONFIDENCE

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 24 d.f.)	Observed Sig. Level
INTRFAC	.5139	.411	4.88224	.0369
GOAL	-.4229	-.343	3.19311	.0866
PBIQ13	-.3167	-.343	3.20707	.0859

DEPENDENT CONSTANT = 5161.847

R = .5325

R^2 = .2836

F-Ratio = 3.17 (with 3 and 24 d.f.)

Significance level = .0428

Confidence. The variables INTRFAC, GOAL, and PBIQ13 accounted for 29 percent of the variation in Social Confidence, with a significance level of .04. Table J-3 in the Appendix illustrates the steps in which the variables were removed from the original equation.

The Principal and Teacher Affiliation. Tables 9 and 10 show the results of regressing the independent variables INTRFAC, PNON, PBIQ5, GOAL, and PBIQ13 against the dependent variable of Teacher Affiliation. This variable describes the pupils' attitude toward the teacher. Students with high scores on Teacher Affiliation generally like their teachers and view the teacher as helpful, understanding, attentive, and generous. Students scoring low on Teacher Affiliation believe that the teacher is inconsiderate and a source of emotional pain.

In the initial equation (see Table 9), three of the five independent variables exhibited negative partial correlations with the criterion variable, Teacher Affiliation. Only INTRFAC (.304) showed a positive directional relationship. Together these five variables yielded a multiple correlation of .5218 and accounted for 27 percent of the variance in teacher affiliation. The F-ratio, 1.65, was not statistically significant.

Table J-4 in the Appendix shows the steps in which the variables were removed from the equation. GOAL was the first to go with PBIQ5, PNON, and INTRFAC following. The only variable remaining in the final equation was PBIQ13, which accounted for 15 percent of the

TABLE 9

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TEACHER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.3675	.304	2.23814	.1489
PNON	-.1833	-.207	.98131	.3326
PBIQ5	.1289	.147	.48253	.4945
GOAL	-.1534	-.130	.37901	.5444
PBIQ13	-.3351	-.350	3.07978	.0932

DEPENDENT CONSTANT = 4556.296

R = .5218

R^2 = .2723

F-Ratio = 1.65 (with 1 and 22 d.f.)

Significance level = .1895

TABLE 10

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TEACHER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ13	-.3918	-.392	4.71613	.0392

DEPENDENT CONSTANT = 5164.705

R = .3918

R^2 = .1535

F-Ratio = 4.72 (with 1 and 26 d.f.)

Significance level = .0392

variation in the criterion variable at a significance level of .04, as shown in Table 10.

The Principal and Peer Affiliation. The Peer Affiliation score of a student corresponds to his or her like or dislike for other children in the school or classroom. Students with high scores on Peer Affiliation believe that they are approved of by their peers and consider their relationships with other children to be of importance. On the other hand, students with low scores on Peer Affiliation see their peers as a potential threat. They view other students as unfriendly, they have few friends, and have difficulty in accepting the responsibilities of friendship.

According to Table 11, three of the five independent variables--PNON (-.195), GOAL (-.382), and PBIQ13 (-.281)--exhibited negative partial correlations with the dependent variable, Peer Affiliation. Only INTRFAC (.450) and PBIQ5 (.053) showed positive relationships. The entire set of variables in the initial equation explained 32 percent of the variance in Peer Affiliation and the F-ratio failed to reach statistical significance at the .10 level.

Table J-4 in the Appendix illustrates the sequential removal of three of the original set of variables. In order of their removal, the variables were PBIQ5, PNON, and PBIQ13.

Table 12 displays the final equation for Peer Affiliation. The two leadership variables, INTRFAC (.438) and GOAL (-.416), which had opposing influences on the dependent variables, were the only

TABLE 11

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON PEER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.5618	.450	5.59946	.0272
PNON	-.1670	-.195	.87179	.3606
PBIQ5	.0447	.053	.06212	.8055
GOAL	-.4670	-.382	3.75987	.0654
PBIQ13	-.2539	-.281	1.89244	.1828

DEPENDENT CONSTANT = 4763.836

$R = .5759$

$R^2 = .3202$

F-Ratio = 2.07 (with 5 and 22 d.f.)

Significance level = .1076

TABLE 12

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON PEER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 25 d.f.)	Observed Sig. Level
INTRFAC	.5800	.438	5.93183	.0223
GOAL	-.5455	-.416	5.24697	.0307

DEPENDENT CONSTANT = 4726.9

R = .4606

R^2 = .2122

F-Ratio = 3.37 (with 2 and 25 d.f.)

Significance level = .0507

two variables retained in the final equation. They accounted for over 20 percent of the variance in the dependent variable, with an F-ratio of 3.37 and a statistical significance level of .05.

The Principal and School Affiliation. If students view school as a positive influence they will enjoy going to school, and will value the activities associated with school. Students viewing school as a negative influence will not enjoy school and school related activities and generally will be negative about the value of school in their lives. The independent variables, PBIQ11, PBIQ13, PBIQ5, INTRFAC, and PNON were used in the regression equation predicting School Affiliation.

Table 13 illustrates that the five independent variables produced a multiple correlation coefficient of .7041, explaining almost 50 percent of the variance in School Affiliation. Four of the five predictor variables had negative partial correlations with the criterion variable. The only variable showing a positive relationship with School Affiliation was INTRFAC (.368). For the initial equation, the F-ratio was statistically significant at the .01 level.

Four of the variables were removed from the equation through stepwise multiple regression procedures. The four variables removed from the equation were PBIQ13, PBIQ5, and INTRFAC, as shown in Table J-6 of the Appendix.

Table 14 presents the final equation of principal related variables regressed on School Affiliation. PBIQ11 (-.481) and

TABLE 13

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SCHOOL AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 21 d.f.)	Observed Sig. Level
PBIQ11	-.5177	-.520	7.79603	.0109
PBIQ13	-.0308	-.040	.03350	.8565
INTRFAC	.4129	.368	3.29773	.0837
PNON	-.3159	-.392	3.80940	.0644
PBIQ5	-.1632	-.215	1.02117	.3237

DEPENDENT CONSTANT = 5536.9161

R = .7041

R^2 = .4957

F-Ratio = 3.44 (with 6 and 21 d.f.)

Significance level = .0159

TABLE 14

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SCHOOL AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 25 d.f.)	Observed Sig. Level
PBIQ11	-.4459	-.481	7.50772	.0112
PNON	-.3271	-.373	4.04119	.0553

DEPENDENT CONSTANT = 5699.015

R = .6103

R^2 = .3725

F-Ratio = 7.42 (with 2 and 25 d.f.)

Significance level = .0030

PNON (-.373), the only two variables retained in the final equation, were again negatively related to the criterion variable. These two variables explained over 37 percent of the variance in School Affiliation and were statistically significant at the .003 level.

Summary of Self-Concept Variables. To summarize, the principal leadership variables INTRFAC and GOAL were the variables most often retained in the final equations. The leadership variables were important in the analysis of Self-Security, Social Confidence, and Peer Affiliation explaining 38, 28, and 21 percent of the variation in the criterion variables, respectively. It may also be noted that in each case the F-ratio was significant at or below the .05 level, and that in each case the leadership variables showed opposite directional relationships with GOAL being consistently negative and INTRFAC being consistently positive with respect to the dependent variables.

Four other variables were also retained in one or more of the final regression equations. PBIQ13 (professional organization meetings attended) was retained in the equations for Social Confidence and Teacher Affiliation. PBIQ11 (number of district committees serving on) and PNON (principals' noninstructional time) were retained for the School Affiliation measure, and PBIQ6 (participation in IGE staff development workshop) remained in the equation predicting Self-Acceptance. In every case, the principal related independent variables showed negative partial correlations and in each instance statistical significance was reached at or below the .10 level.

Student Achievement Equations

The student achievement outcome measures were taken from Sigurdson (1976). Students in the sample were administered the mathematics and reading sections of the Comprehensive Tests of Basic Skills (CTBS). Selected principal related variables were entered into regression equations to predict student outcomes in reading and mathematics in IGE schools.

The Principal and Reading Vocabulary. A third of the children in the sample took the reading test. The test yielded separate scores for vocabulary and comprehension as well as a total reading score. For each subscale of the reading test, five principal related variables were entered into the regression equation. These variables included INTRFAC (score on interaction facilitation); PNON (principals' noninstructional time); PBIQ5 (sex); GOAL (score on goal emphasis); and PBIQ13 (number of meetings of professional organizations attended each year).

Tables 15 and 16 show the regressions for these five variables on Reading Vocabulary. These variables generated a multiple correlation coefficient of .4343 and accounted for less than 20 percent of the variance in Reading Vocabulary. Two of the variables, GOAL (-.198) and PBIQ13 (-.133) showed low negative partial correlations with the criterion variable, as pictured in Table 15. The F-ratio was not statistically significant.

Table J-7 in the Appendix shows that four of the five variables entered in the initial equation were removed when the stepwise

TABLE 15

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON READING VOCABULARY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.2608	.210	1.01094	.3256
PNON	.0748	.081	.38286	.7055
PBLQ5	.3261	.334	1.66462	.1102
GOAL	-.2499	-.198	.90230	.3535
PBIQ13	-.1269	-.133	.39610	.5356

DEPENDENT CONSTANT = 39.17637

R = .4343

R^2 = .1886

F-Ratio = 1.02 (with 5 and 22 d.f.)

Significance level = .4284

TABLE 16

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON READING VOCABULARY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ5	.3449	.345	3.51006	.0723

DEPENDENT CONSTANT = 41.068

R = .3449

R^2 = .1189

F-Ratio = 3.51 (with 1 and 26 d.f.)

Significance level = .0723

regression procedure was used. These variables included, in order of their removal, PNON, PBIQ13, INTRFAC, and GOAL.

The only variable retained in the final regression equation was PBIQ5 (sex). This variable alone accounted for 12 percent of the variation in Reading Vocabulary scores. The F-ratio was significant at the .07 level.

The Principal and Reading Comprehension. The independent variables INTRFAC, PNON, PBIQ5, GOAL, and PBIQ13, when regressed against Reading Comprehension, produced a pooled multiple correlation coefficient of .4596, accounting for slightly more than 21 percent of the variance in the dependent variable. The F-ratio was not statistically significant, as shown in Table 17.

Table J-8 in the Appendix indicates that the stepwise procedure removed four of the five independent variables from the regression equation. The variables removed were PNON, GOAL, INTRFAC, and PBIQ13.

As illustrated in Table 18, PBIQ5 (sex) was the only variable retained in the final equation. The variable was significant at the .0698 level, accounting for a little over 12 percent of the variance in Reading Comprehension.

The Principal and Total Reading. The equations for the five principal related variables and Total Reading are shown in Tables 19 and 20. All of the variables--INTRFAC (.214), PNON (.094), PBIQ5 (.339), GOAL (-.182), and PBIQ13 (-.173)--showed low partial correlations with Total Reading. Two of the variables, GOAL, and PBIQ13

TABLE 17

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON READING COMPREHENSION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.2918	.236	1.30213	.2661
PNON	.0949	.104	.24267	.6272
PBIQ5	.3295	.342	2.91187	.1020
GOAL	-.2064	-.167	.63297	.4348
PBIQ13	-.1781	-.188	.80258	.3800

DEPENDENT CONSTANT = 37.74970

R = .4596

R^2 = .2113

F-Ratio = 1.18 (with 5 and 22 d.f.)

Significance level = .3513

TABLE 18

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON READING COMPREHENSION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ5	.3477	.348	3.5766	.0698

DEPENDENT CONSTANT = 41.862

R = .3477

R^2 = .1209

F-Ratio = 3.58 (with 1 and 26 d.f.)

Significance level = .0698

were negatively correlated with the dependent variable. Table 19 shows that the five variables as a group explained only 20 percent of the variance in Total Reading. The F-ratio was not statistically significant.

Table J-9 indicates that four of the five variables were removed from the equation using stepwise multiple regression procedures. PNON, PBIQ13, GOAL, and INTRFAC were, in turn, eliminated from the equation.

The final regression equation for selected principal related variables and Total Reading is shown in Table 20. Again, only PBIQ5 was retained in the final equation. PBIQ5 contributed approximately 12 percent of the variation in Total Reading and was statistically significant at the .07 level.

The Principal and Mathematics Computation. Tables 21 and 22 report the multiple regression equations for Mathematics Computation and the five principal related independent variables. Table 21 shows the partial correlations of INTRFAC, PNON, PBIQ5, GOAL, and PBIQ13 against the dependent variable. The five variables contributed to a multiple correlation coefficient of .4947 and explained a little more than 24 percent of the variance in Mathematics Computation.

As indicated in Table J-10 of the Appendix, the four variables removed from the equation included PBIQ5, PNON, PBIQ13, and INTRFAC. Table 22 shows that only the principal leadership variable

TABLE 19

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TOTAL READING

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.2646	.214	1.05838	.3148
PNON	.0859	.094	.44353	.6617
PBIQ5	.3287	.339	1.69224	.1047
GOAL	-.2266	-.182	-.86866	.3944
PBIQ13	-.1646	-.173	-.82348	.4191

DEPENDENT CONSTANT = 38.30567

R = .4498

R^2 = .2023

F-Ratio = 1.12 (with 5 and 22 d.f.)

Significance level = .3806

TABLE 20

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TOTAL READING

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ5	.3505	.350	3.63700	.0676

DEPENDENT CONSTANT = 40.963

R = .3503

R^2 = .1227

F-Ratio = 3.64 (with 1 and 26 d.f.)

Significance level = .0676

TABLE 21

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON MATH COMPUTATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
INTRFAC	.3311	.271	1.75058	.1994
PNON	.1448	.162	.59025	.4505
PBIQ5	.0397	.045	.04408	.8356
GOAL	-.5443	-.416	4.59756	.0433
PBIQ13	-.1851	-.199	.90531	.3517

DEPENDENT CONSTANT = 51.79025

R = .4947

R^2 = .2447

F-Ratio = 1.43 (with 5 and 22 d.f.)

Significance level = .2542

TABLE 22

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES
ON MATH COMPUTATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
GOAL	-.3554	-.197	3.75760	.0635

DEPENDENT CONSTANT = 59.122

R = .3554

R^2 = .1263

F-Ratio = 3.76 (with 1 and 26 d.f.)

Significance level = .0635

GOAL was retained in the final regression equation. GOAL was negatively correlated with Mathematics Computation and accounted for 12 percent of the variation in the criterion variable. The variable exhibited an F-ratio of 3.76, statistically significant at the .06 level.

The Principal and Mathematics Applications. The multiple regression procedures used to look at the relationship between principal related variables and Mathematics Applications showed results similar to those obtained for the previous equation. The results of these regressions are shown in Tables 23 and 24. According to Table 23, the partial correlation coefficients for the five variables PBIQ10, PBIQ5, INTRFAC, PNON, and GOAL were consistently low. These variables as a collective accounted for almost 18 percent of the variance in the Mathematics Applications measure. The F-ratio was not statistically significant.

Table J-11 in the Appendix shows the steps in which the variables contributing least to the explained variance in the dependent variable were removed from the regression equation. PNON was the first to be removed, followed by INTRFAC, GOAL, and PBIQ5.

The only variable remaining in the final equation was PBIQ10. This variable alone had a partial correlation coefficient of .379 and accounted for slightly more than 14 percent of the variation in the dependent variable, Mathematics Applications. The final equation showed an F-ratio of 4.37 at a statistical significance level of .05.

TABLE 23

INITIAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON MATH APPLICATIONS

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 22 d.f.)	Observed Sig. Level
PBLQ10	.3025	.294	2.07837	.1635
PBIQ5	.1425	.149	.49862	.4875
INTRFAC	.1612	.126	.35535	.5572
PNON	.0431	.047	.04937	.8262
GOAL	-.1652	-.129	.37198	.5482

DEPENDENT CONSTANT = 41.41951

R = .4220

R^2 = .1781

F-Ratio = .95 (with 5 and 22 d.f.)

Significance level = .4670

TABLE 24

FINAL REGRESSION OF SELECTED PRINCIPAL VARIABLES ON MATH APPLICATIONS

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ10	.3795	.379	4.37371	.0464

DEPENDENT CONSTANT = 44.914

R = .3795

R^2 = .1440

F-Ratio = 4.37 (with 1 and 26 d.f.)

Significance level = .0464

Summary of Achievement Variables. Three principal related variables were retained in at least one of the regression equations involving student achievement in reading and mathematics. Clearly, PBIQ5 (sex) was of some importance in the reading scores of pupils sampled. For each of the dependent measures of reading achievement, this variable was retained in the final equation with a significance level below .10, and explaining in each case approximately 12 percent of the variation in the dependent variable. GOAL and PBIQ10 were retained for Mathematics Computation and Mathematics Applications, respectively. PBIQ10 (years teaching in an IGE school) was positively correlated with the criterion variable with a significance level of .05. GOAL (goal emphasis leadership) was negatively related to the dependent variable, Mathematics Computation, at a statistically significant level of .07.

Composite Principal Variables

Tables 25 to 33 report the results of regressions of a set of composite principal related variables against selected subscales of the self-concept criterion variable. Those variables which were retained in one or more of the final regression equations of the first run were combined and used in subsequent analyses in an attempt to obtain more useful predictors for the subscales of the dependent variable. The variables making up the composite group included PBIQ5, PBIQ6, PBIQ11, PBIQ13, PNON, GOAL, AND INTRFAC.

Composite Variables and Social Maturity. Social maturity is a scale which measures whether or not children know how they should think and feel in a variety of social situations. Students scoring high on Social Maturity know the importance of fair play, sharing, perseverance, and generosity. Children scoring low on this scale have not learned these notions and exhibit behavior characterized as selfish, inconsiderate, and immature. It should be noted at this point that the initial regressions of independent variables against the criterion of Social Maturity produced no useful predictors and for this reason it was subjected to a second run.

Table 25 reports the regression of composite principal variables on Social Maturity. The initial equation produced a multiple correlation coefficient of .5988 accounting for over 35 percent of the variance in Social Maturity. PBIQ11 produced the highest partial correlation coefficient, .469. It is worth noting that only in this equation did GOAL produce a positive partial correlation, (.128).

Table J-12 in the Appendix presents the steps in which the independent variables were removed from the initial equation, the least important predictor being the first to go. INTRFAC was the first to be removed, followed by PNON, PBIQ5, PBIQ6, and GOAL.

Table 26 shows the final regression equation with PBIQ11 and PBIQ13 being the two remaining variables. These two variables accounted for almost 30 percent of the variation in Social Maturity. The F-ratio was 4.98 and the significance level was .01.

TABLE 25

INITIAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON SOCIAL MATURITY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 20 d.f.)	Observed Sig. Level
PBIQ5	.1685	.196	.80299	.3809
PBIQ6	.1804	.198	.90393	.3768
PBIQ11	.5282	.469	5.65277	.0275
PBIQ13	-.3153	-.341	2.63193	.1204
PNON	-.0559	-.066	.08767	.7702
GOAL	.1709	.128	.33392	.5698
INTRFAC	.0392	.032	.02076	.8869

DEPENDENT CONSTANT = 3647.436

R = .5988

R^2 = .3586

F-Ratio = 1.60 (with 7 and 20 d.f.)

Significance level = .1936

TABLE 26

FINAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON SOCIAL MATURITY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 25 d.f.)	Observed Sig. Level
PBIQ11	.4701	.482	7.55608	.0109
PBIQ13	-.3311	-.361	3.74943	.0642

DEPENDENT CONSTANT = 4787.34

R = .5336

R^2 = .2848

F-Ratio = 4.98 (with 2 and 25 d.f.)

Significance level = .0152

Composite Variables and Peer Affiliation. The initial regression of selected independent variables against Peer Affiliation resulted in the retention of the leadership variables which together accounted for 21 percent of the variance in the dependent variable. As was hoped, however, a more useful prediction was obtained from a second run using the composite set of independent variables--PBIQ5, PBIQ6, PBIQ11, PBIQ13, PNON, GOAL, and INTRFAC (see Table 27).

The initial equation resulted in a multiple correlation coefficient of .6606. Four of the seven variables, PBIQ5 (-.001), PBIQ13 (-.380), PNON (-.263), GOAL (-.126), were negatively related to the dependent variable. The variables as a group accounted for over 43 percent of the variation in Peer Affiliation. The F-ratio was 2.21 with a statistical significance of .08.

Five of the original seven variables were removed through stepwise multiple regression procedures. The variables removed were PBIQ5, GOAL, PBIQ6, INTRFAC, and PNON, as shown in Table J-13 of the Appendix.

The variables retained in the final equation are shown in Table 28. The variables PBIQ11 and PBIQ13 showed partial correlation coefficients of .429 and -.425, respectively, and accounted for almost 30 percent of the variation in Peer Affiliation. The results were significant at the .02 level. It is noteworthy that the leadership variables GOAL and INTRFAC, which had remained as the most useful predictors of Peer Affiliation in the initial equation, were

TABLE 27

INITIAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON PEER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 20 d.f.)	Observed Sig. Level
PBIQ5	-.0007	-.001	.00002	.9967
PBIQ6	.1741	.204	.86687	.3629
PBIQ11	.4317	.406	3.94709	.0608
PBIQ13	-.3348	-.380	3.37889	.0809
PNON	-.2161	-.263	1.49134	.2362
GOAL	-.1578	-.126	.32429	.5754
INTRFAC	.3272	.276	1.64851	.2138

DEPENDENT CONSTANT = 4481.6725

R = .6606

R^2 = .4364

F-Ratio = 2.21 (with 7 and 20 d.f.)

Significance level = .0775

TABLE 28

FINAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES
ON PEER AFFILIATION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 25 d.f.)	Observed Sig. Level
PBIQ11	.4078	.429	5.64923	.0254
PBIQ13	-.4026	-.425	5.50705	.0272

DEPENDENT CONSTANT = 4937.847

R = .5292

R^2 = .2800

F-Ratio = 4.86 (with 2 and 25 d.f.)

Significance level = .0165

among the first to be removed from the equation when the composite set of variables was analyzed.

Composite Variables and Reading Vocabulary. In the initial run, PBIQ5 (sex) proved to be the most useful predictor for all of the dependent measures of reading. The results for the second run of composite principal related variables on reading are presented in Tables 29 and 30.

The variables PBIQ5, PBIQ6, PBIQ11, PBIQ13, PNON, GOAL, and INTRFAC were regressed on Reading Vocabulary, as shown in Table 29. The variables taken together explained approximately 27 percent of the variance in Reading Vocabulary. The partial correlation coefficients for the seven variables were uniformly low and produced an F-ratio of 1.04.

Table J-14 in the Appendix shows the steps in which the variables contributing least to the explained variance in the criterion variable were removed from the initial equation. PNON was the variable contributing least; the variable PBIQ5 was the last to be removed from the equation.

The final equation is shown in Table 30. PBIQ11 was the sole variable to be retained in the equation. This variable displayed a partial correlation coefficient of .359 and explained almost 13 percent of the variance in Reading Vocabulary. These results were significant at the .06 level.

Composite Variables and Reading Comprehension. Tables 31 and 32 present the results of the regression of the seven independent

TABLE 29

INITIAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON READING VOCABULARY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 20 d.f.)	Observed Sig. Level
PBIQ5	.2586	.276	1.65434	.2131
PBIQ6	-.0838	-.088	.15441	.6985
PBIQ11	.2974	.270	1.56746	.2250
PBIQ13	-.2017	-.212	.94244	.3432
PNON	.0002	.000	.00000	.9992
GOAL	-.0951	-.067	.09051	.7666
INTRFAC	.1359	.104	.21863	.6451

DEPENDENT CONSTANT = 41.42648516

R = .5164

R^2 = .2667

F-Ratio = 1.04 (with 7 and 20 d.f.)

Significance level = .4358

TABLE 30

FINAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON READING VOCABULARY

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ11	.3593	.359	3.85525	.0604

DEPENDENT CONSTANT = 47.163

R = .3593

R^2 = .1291

F-Ratio = 3.86 (with 1 and 26 d.f.)

Significance level = .0604

TABLE 31

INITIAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES
ON READING COMPREHENSION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 20 d.f.)	Observed Sig. Level
PBIQ5	.2761	.298	1.94534	.1784
PBIQ6	.0510	.054	.05900	.8106
PBIQ11	.3442	.313	2.16572	.1567
PBIQ13	-.2529	-.266	1.52808	.2307
PNON	.0363	.041	.03343	.8568
GOAL	.0206	.015	.00436	.9480
INTRFAC	.1163	.090	.16507	.6888

DEPENDENT CONSTANT = 36.10332

R = .5376

R^2 = .2891

F-Ratio = 1.16 (with 7 and 20 d.f.)

Significance level = .3670

TABLE 32

FINAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES
ON READING COMPREHENSION

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ11	.3533	.353	3.70776	.0652

DEPENDENT CONSTANT = 47.5966

R = .3533

R^2 = .1248

F-Ratio = 3.71 (with 1 and 26 d.f.)

Significance level = .0652

variables (PBIQ5, PBIQ6, PBIQ11, PBIQ13, PNON, GOAL, and INTRFAC) on Reading Comprehension. As was the case with the regression of the independent variables on Reading Vocabulary, an initial run of independent variables against Reading Comprehension resulted in PBIQ5 (sex) being retained in the final equation as the most useful predictor of the criterion variable.

Table 31 presents the initial equation consisting of the seven independent variables regressed against Reading Comprehension. The partial correlation coefficients for the independent variables were generally low, with PBIQ11 having the highest partial correlation. The set of seven variables generated a multiple correlation coefficient of .5376, explaining approximately 29 percent of the variance in Reading Comprehension. The F-ratio was not statistically significant at the .10 level.

In Table J-15, the stepwise regression procedure which removed those variables contributing least to the variance in the dependent variable is illustrated. GOAL was the first variable to be removed and PNON was the second to fall. PBIQ6, INTRFAC, PBIQ13, and PBIQ5 rounded out the sequence. Again, PBIQ5, the best predictor of Reading Comprehension for the initial regression run was the last variable to be removed from the equation the second time around.

As in the case of Reading Vocabulary, PBIQ11 also proved to be the best predictor of Reading Comprehension. As seen in

Table 32, PBIQ11, with a partial correlation coefficient of .353, accounted for over 12 percent of the variation in the dependent variable. The F-ratio was 3.71 and was statistically significant at the .06 level.

Composite Variables and Total Reading. The last equation to be considered is the regression of the composite set of principal related variables on Total Reading. The results obtained from this analysis were very similar to the results obtained from regressions of the composite variables on Reading Vocabulary and on Reading Comprehension discussed above. These results are presented in Tables 33 and 34.

As shown in Table 33, the partial correlation coefficients of the seven composite variables PBIQ5 (.288), PBIQ6 (-.003), PBIQ11 (.302), PBIQ13 (-.254), PNON (.022), GOAL (-.017), and INTRFAC (.082) are quite low. In concert, these variables contributed 28 percent to the explained variance in Total Reading. The F-ratio for this group was not statistically significant.

Table J-16 in the Appendix summarizes the steps in which the variables making the least contribution to the explained variance were removed from the equation using stepwise multiple regression techniques. Six variables were removed from the equation, with PBIQ6 being removed first and PBIQ5 being the last variable removed.

Again, PBIQ11 with a partial correlation coefficient of .360 was the most useful predictor, explaining almost 13 percent of the

TABLE 33

INITIAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES
ON TOTAL READING

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 20 d.f.)	Observed Sig. Level
PBIQ5	.2682	.288	1.81295	.1932
PBIQ6	-.0030	-.003	.00020	.9890
PBIQ11	.3334	.302	2.00797	.1719
PBIQ13	-.2413	-.254	1.37396	.2549
PNON	.0194	.022	.00938	.9238
GOAL	-.0237	-.017	.00571	.9405
INTRFAC	.1055	.082	.13424	.7179

DEPENDENT CONSTANT = 38.126132

R = .5295

R^2 = .2804

F-Ratio - 1.11 (with 7 and 20 d.f.)

Significance level = .3929

TABLE 34

FINAL REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON TOTAL READING

Variable	Standardized Regression Coefficient	Partial Correlation Coefficient	Partial F Value (1 and 26 d.f.)	Observed Sig. Level
PBIQ11	.3597	.360	3.86269	.0601

DEPENDENT CONSTANT = 47.276

R = .3597

R^2 = .1293

F-Ratio = 3.86 (with 1 and 26 d.f.)

Significance level = .0601

variance in Total Reading. The F-ratio was 3.86 and was statistically significant at the .06 level, as illustrated in Table 34.

Path Analysis

In the preceding sections of this chapter, multiple regression techniques were used to sort out those variables which maximized the explanatory power of the model of the principal's production function in IGE schools. This involved simply identifying those variables which proved to be important in influencing the reading and mathematics scores of pupils. There was no indication, however, as to how the variables interacted with other variables in the model. Regression analysis, then, provided only bits and pieces of the educational picture. It is the function of path analysis to bring together these static, isolated sketches into a dynamic, unified whole so that the educational process is visible in panoramic proportions. This section reports the results of the use of path analysis procedures to determine the manner in which principal-related variables and other variables were linked to student outcomes.

According to Nie (1975), path analysis is "a method for tracing out the implications of a set of causal assumptions which the researcher is willing to impose upon a system of relationships" (p. 389). This method has often been described as a means of showing empirically what is believed to be true about a relationship.

Actually, the procedure itself may be secondary to the logical assumptions about a model or set of underlying relationships. For this reason, it is always necessary to speculate in advance about how a model is thought to operate before submitting it to statistical test.

In the model to be presented, principal's leadership is the variable of key concern. Since it is recognized that a number of other variables bear importantly upon student outcomes, the model is not "complete." The logical assumptions underlying the model are derived from both empirical studies and a priori knowledge of the educational process. The reader is referred to Chapter II where it was hypothesized that the "true" relationship between principal leader behavior and student cognitive behavior could occur either (1) directly, (2) indirectly through teachers, or (3) indirectly through school climate. Direct effects are illustrated through direct regression procedures. Indirect effects are illustrated through the decomposition feature of path analysis, a detailed discussion of which can be found in Alwin and Hauser (1975).

Path analysis is recognized as a causal model consisting of a set of linear, additive regression equations. According to the University of Wisconsin-Milwaukee's Basic Statistical Package, "Each equation in the set represents an integral part of a causal process assumed to operate among the variables under consideration" (p. 4). A path analysis involves exogenous, endogenous, and

residual variables. Each of these types of variables is discussed more fully below.

Exogenous variables essentially define the starting point of the model. They are further defined as those variables "whose total variation is assumed to be caused by variables outside the model" (Basic Statistical Package, p. 4). The exogenous variable in the present study, for example, is SCHSIZ (school size). School size is generally not "caused" by other variables to be presented in the model such as leadership and teacher job satisfaction. However, school size could influence these variables.

The Basic Statistical Package defines endogenous variables as "variables whose variations are assumed to be caused by linear combinations of other variables in the model" (p. 4). The endogenous variables in the model reported here are the leadership variables, (INTRFAC and GOAL), teacher job satisfaction (TCHJSAT), and the ultimate criterion variable, mathematics applications (MATHAPPL). The principal and teacher variables were placed in the model based on the information and hypotheses presented at the end of Chapter II. Mathematics applications was used as the dependent measure of student outcomes because it was strongly related to principal-related variables, as reported in the regression analyses presented in earlier sections of this chapter.

Finally, according to the Basic Statistical Package, residual variables are "unmeasured variables representing variations or

disturbances not explained by the exogenous and endogenous variables within the system" (p. 5). The residual is represented by the error term associated with MATHAPPL.

The Path Model

The path model is the pictorial representation of the causal relationships assumed to hold among the variables under consideration. The relationships posited for the present study are subsumed in the path diagram shown in Figure 2.

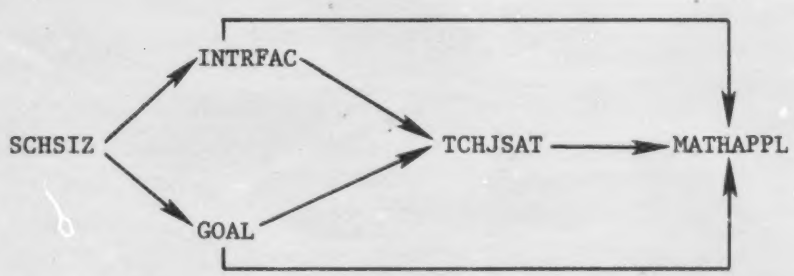

Figure 2. Principal Leadership in the Educational Process.

The foregoing model is a graphic representation of the three hypotheses set forth in Chapter II. The model suggests that a causal relationship exists between student cognitive outcomes and principal leadership behavior. According to the model, the effect of the principal's leadership on mathematics achievement may be direct as shown by the arrows running directly from INTRFAC and GOAL to the student outcome variable, MATHAPPL. The model further suggests that the relationship between principal leadership and student

outcomes may be mediated through teacher variables, as depicted by the arrows running from the leadership variables (GOAL and INTRFAC) to teacher job satisfaction (TCHJSAT) and from TCHJSAT to the pupil outcome variable, MATHAPPL. A final relationship mediated by principal leadership is posited between school climate represented by school size (SCHSIZ) and pupil outcomes.

Results

A "hierarchical regression strategy" (Allen and Bielby, 1977) was used to estimate the standardized regression coefficients or path coefficients for the regression equations. Since the model is recursive, ordinary least squares regression techniques were applied in estimating the model. In accordance with the hierarchical regression strategy, each of the two leadership variables was regressed upon school size (SCHSIZ), teacher job satisfaction was then entered against the leadership variables, and finally the pupil mathematics score variable was regressed against all preceding variables in the model. The path coefficients for these relationships are shown in Table 35.

Generally, in interpreting the results, one looks for a change in the magnitude of the path coefficient to determine the direct or indirect nature of a relationship between variables. If the multiple correlation coefficient increases significantly with the introduction of a variable into the equation, it is assumed that the variable entered has a mediating effect.

TABLE 35

STANDARDIZED COEFFICIENTS OF PATH ANALYSIS OF AN INCOMPLETE MODEL OF THE PRINCIPAL IN THE EDUCATIONAL PRODUCTION PROCESS (MATH APPLICATIONS)

	Dependent Variables			
	Leadership		Teacher	Student Outcomes
Independent Variables	INTRFAC	GOAL	TJSAT	MATHAPPL
SCHSIZ	-.1078	-.0783		-.2489
INTRFAC			.3391	.0947
GOAL			.5109	-.4975
TJSAT				.4019
r^2 =	.0116	.0061	.6069	.1815

The first column of Table 35 shows the effect of school size (SCHSIZ) on interaction facilitation (INTRFAC). SCHSIZ explains only one percent of the variance in INTRFAC. SCHSIZ has an even smaller effect on GOAL, accounting for less than one percent of the variance in that variable, as shown in the second column of the table.

The hypothesized direct path between the leadership variables and teacher job satisfaction is clearly evident. INTRFAC and GOAL exhibited path coefficients of .3391 and .5109, respectively, and together accounted for over 60 percent of the variation in TCHJSAT. All of the preceding variables in the model were then entered into an equation with MATHAPPL, the ultimate dependent variable in the model. The highest path coefficient was exhibited by GOAL (-.4975), followed by TCHJSAT (.4019). The four variables as a collective accounted for 18 percent of the variance in MATHAPPL. The magnitude of the error term (.91) indicates that much of the variation in the dependent variable is explained by factors outside of the model presented here.

The path diagram shown in Figure 3 helps to make clearer the posited relationships between the variables.

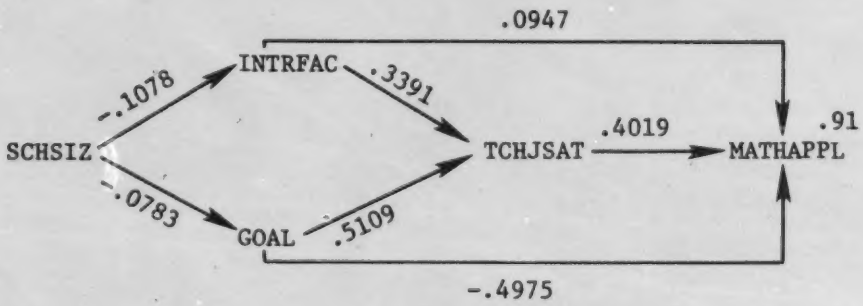

Figure 3. Magnitude of Posited Relationships Between Principal Leadership and Other Variables.

Summary

In this chapter the statistical techniques used to analyze the data were discussed and illustrated. Correlation analysis, backward stepwise multiple regression, and path analysis techniques were used. In the following chapter, the findings of these procedures will be discussed, conclusions based on these findings will be drawn, and implications for future research will be suggested.

CHAPTER V

SUMMARY OF FINDINGS, CONCLUSIONS AND IMPLICATIONS

This final chapter consists of three sections. The first section contains a review of the purpose of the study, the organization and development of the study, and the statistical techniques used to test hypotheses of the study. The second section summarizes the findings and conclusions of the study. A third and final section of this chapter presents the implications for future research of the results of the study.

Summary of the Study

In the first chapter of the study, the question, "Do principals make a difference?" was put forth in relation to the more general concern for productivity and effectiveness in the education of pupils in the nation's schools. The school was placed in the context of systems theory and the economic theory of the firm, which were synthesized in a conceptual framework for economic analysis of schooling. Within this framework, the principal was viewed as a subsystem of the educational production system with a unique and important role to play in producing pupil cognitive and affective outcomes. A principal's "production function" was specified based on empirical research, a priori knowledge of the educational process

and the conceptual framework for economic analysis of schooling. Three sets of principal-related variables were identified for inclusion in the model. These were background variables describing the principals' education, experience, and personal attributes; leadership variables describing the principals' behavior; and time utilization variables describing how the principal allocated time to various tasks. The background variables were considered as input variables, while the leadership and utilization of time variables were viewed as process variables according to the conceptual framework.

The second chapter could have been titled, "How Do Principals Make A Difference?" In this chapter, a case was made for the principal's leader behavior as being an important factor in influencing the educational outcomes of pupils. Four major theories of leadership--the Great Man, Traitist, Situational, and Behavioral--were discussed and evaluated. The behavioral theory, of which the leadership construct used in the present study was a part, was rated highly as a predictor of leader behavior in school settings. Empirical evidence and a priori knowledge were used as a basis for hypotheses concerning the direct or indirect nature of the effect of leadership on student outcomes.

The present study re-analyzed a dataset collected in 1976 for use by three projects of the Wisconsin Research and Development Center. From a national sample of 41 schools, a subsample of 28

schools was used in the present study. Average school scores were used as the unit of analysis. Pearson Product-Moment correlations, multiple regression analysis, and path analysis techniques were used to analyze the data, as described in Chapter III. Chapter IV presented the results of the data analyses.

Findings and Conclusions

This section reports the major findings derived from the analysis of the data. The findings are presented in three steps: (1) the results of the Pearson Product-Moment correlations used to test for statistically significant relationships among independent and dependent variables; (2) the results of the multiple regression procedures used to estimate the principal's production function; (3) the results of the path analysis techniques used to test the final three hypotheses concerning the nature of the principal's influence on student outcomes. The probability level for all tests of statistical significance was established at the .10 level.

Findings: Principal Variables and Student Achievement

The major findings for the first six hypotheses were:

Hypothesis 1: There is no significant relationship between the four subscales comprising principal leadership behavior (leader support, goal emphasis, work facilitation, and interaction facilitation) and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

Finding: A statistically significant relationship was found between GOAL (goal emphasis) and MATHCOMP (mathematics computations). No other statistically significant relationships were found among the subscales of leadership and the subscales of student achievement. Therefore, the null hypothesis could be rejected only for the relationship between GOAL and MATHCOMP.

Hypothesis 2: There is no significant relationship between selected principal background variables and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

Finding: Statistically significant relationships were found

between the background variable PBIQ5 (sex) and two reading subscales, VOCAB (reading vocabulary) and COMPREH (reading comprehendion) and with READ (total reading). A statistically significant relationship also was found between PBIQ10 (years of work in an IGE school) and MATHAPPL (mathematics applications). Therefore, the null hypothesis was rejected for those relationships.

Hypothesis 3: There is no significant relationship between principals' utilization of time (total instructional time, and subscales of noninstructional time including supervision, planning, testing, record keeping, inservice, clerical, administrative, other, and total noninstructional time) and student achievement in:

(a) Reading Vocabulary

(b) Reading Comprehension

(c) Total Reading

(d) Mathematics Computation

(e) Mathematics Concepts

(f) Mathematics Applications

(g) Total Mathematics

Finding: No statistically significant relationship was found among any of the principals' utilization of time variables and the subscales of student achievement.

Therefore, the null hypothesis could not be rejected.

Hypothesis 4: There is no significant relationship between the four subscales comprising principal leader behavior (leader support, goal emphasis, work facilitation, and interaction facilitation) and student self-concept as measured by the subscales of the Self-Observation Scales (SOS):

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affiliation

(g) School Affiliation

Finding: The relationship between INTRFAC (interaction facilitation) and SECURITY (self-security) was found to be statistically significant. No other relationships between the subscales of leader behavior and the subscales of student self-concept were found to be statistically significant. Thus, the null hypothesis could not be rejected except for the relationship between INTRFAC and SECURITY.

Hypothesis 5: There is no significant relationship between the selected principal background variables and student self-concept as measured by the Self-Observation Scales (SOS):

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affiliation

(g) School Affiliation

Finding: Statistically significant relationships were found between PBIQ6 (participation in an IGE development workshop) and ACCEPT (self-acceptance); between PBIQ11 (number of district committee memberships) and SCHLAFFIL (school affiliation); and between PBIQ13 (number of professional meetings attended) and two self-concept variables, CONFIDENT (social confidence) and PEERAFFIL (peer affiliation). Therefore, the null hypothesis was rejected for those relationships and retained for all other relationships.

Hypothesis 6: There is no significant relationship between principals' utilization of time and student self-concept as measured by the subscales of the Self-Observation Scales:

(a) Self-Acceptance

(b) Self-Security

(c) Social Confidence

(d) Social Maturity

(e) Teacher Affiliation

(f) Peer Affiliation

(g) School Affiliation

Finding: Only the relationship between PNON (principal's total noninstructional time) and SCHLAFFIL (school affiliation) was found to be statistically significant. Therefore, the null hypothesis could not be rejected except for that one relationship.

Findings: The Principal's Production Function

Variables used to specify the principal's production function were selected from the group of variables displaying statistically significant product-moment correlations in the preceding analysis. These variables were used in ordinary least squares regression equations to determine those variables which were most useful in explaining variance in student cognitive and affective behavior. The findings were:

(1) Student achievement--The variables remaining in the final equation for student achievement subscales, and thus considered important in the production of achievement, were PBIQ10 (number of years in an IGE school), PBIQ5 (sex), and GOAL (goal emphasis).

(2) Student self-concept--The variables remaining in the final equation for student self-concept subscales were PBIQ13

(number of professional meetings attended); PBIQ11 (number of district committee memberships); PNON (principal's total noninstructional time); INTRFAC (interaction facilitation); and GOAL (goal emphasis). At least one variable from each category--leadership, background, and use of time--was found to be influential in the production of self-concept.

Findings: The nature of the Principal's Influence

Path analysis techniques were used to test three hypotheses concerning the nature of the principal's influence on student outcomes:

Hypothesis 1: There is a direct relationship between principal leader behavior and student achievement.

Finding: The path coefficients for INTRFAC and GOAL were .0947 and -.4975, respectively. INTRFAC showed virtually no effect on the dependent variable. GOAL showed a moderate negative effect in the final regression equation with MATHAPPL as the dependent variable but did not attain statistical significance. Therefore, the hypothesis was not confirmed.

Hypothesis 2: The relationship between principal leader behavior and student achievement is mediated by teacher job satisfaction.

Finding: The relationship between principal leadership variables and student achievement is hypothesized as an

indirect relationship. The indirect effect of INTRFAC and TCHJSAT (teacher job satisfaction) on MATHAPPL is the product of the standardized regression coefficients (path coefficients) of the two variables, or .1363 (.3391 x .4019). The indirect influence of GOAL on the relationship between TCHJSAT and MATHAPPL was .2053 (.5109 x .4019). Although TCHJSAT seems to be influenced by GOAL to a slightly greater extent than it is by INTRFAC, none of the relationships approached statistical significance as indicated by the F-ratio for the regression equation. The hypothesis was not confirmed.

Hypothesis 3: The leadership variables act as intervening variables between school climate and student outcomes.

Finding: The path coefficients between the leadership variables INTRFAC and GOAL and the school climate variable, SCHSIZ, approached zero indicating that these variables were virtually unrelated. Therefore, the hypothesis was not confirmed.

Conclusions

The following conclusions may be drawn concerning principal-related variables and student outcomes based upon the findings of the study:

Conclusion 1: There were statistically significant relationships between some of the principal background variables and student achievement in reading and mathematics. The number of years a principal had worked in an IGE school and the sex of the principal were both correlated significantly with these measures of the cognitive development of pupils. The number of years the principal had been working in an IGE school was more influential for mathematics while the principal's sex had a greater impact on reading. In the sample, the advantage was with male principals. This finding is in contrast to previous findings that female teachers tend to have a greater impact on reading achievement of pupils while male teachers figure more heavily in mathematics achievement.

Conclusion 2: There was one statistically significant relationship between principal leadership variables and student achievement. Goal emphasis, or the extent to which the principal stressed high standards of performance by teachers, was the only leadership-related variable which correlated with student achievement at a statistically significant level. This finding is in harmony with the findings of previous research studies on leadership and achievement. It should be noted that relationships between goal emphasis and achievement measures were consistently negative in this study. That is, principals perceived by teachers to stress

goal emphasis, on balance, were associated with low achievement scores in pupils. One can only speculate about the reasons for this finding. It has been suggested that perhaps those principals scoring high on goal emphasis contribute to a regimented atmosphere which is reflected throughout the school building and is absorbed by students who are in turn stymied in their academic development. This rationale is weak, however, and the explanation for this curious finding could possibly be a result of the instrument used to measure leader behavior. It is possible that the validity of the instrument as a measure of student outcomes leaves something to be desired.

Conclusion 3: There were no statistically significant relationships found between the way principals utilized their time and student achievement. This finding is not surprising if the principals' utilization of time is viewed in the context of the principal's managerial role in the school. The sample of principals in this study spent almost 100 percent of their time engaging in activities such as supervision, administration, evaluation, and record keeping. One would not expect these activities to have a direct impact on student achievement.

Conclusion 4: There were statistically significant relationships between some of the principal background variables and

student self-concept. Participation in IGE staff development workshops, memberships on district committees, and number of professional organization meetings attended were all significantly correlated with self-concept. The three variables, taken together, reflect an interest on the part of the principal in enhancing his or her personal and professional development through interaction with peers. The pupil criterion measures against which these variables were regressed reflected pupils' identification with the school or authority figures within the school. It is noteworthy that two out of three of the "professional development" variables produced a negative correlation with the student self-concept measures. This finding suggests that the principal's absence from the school to attend meetings can be viewed in at least two ways. First, one would expect that attendance at professional organizational meetings would allow for an exchange of information and ideas which could be brought back to the school resulting in increased educational opportunities for pupils. On the other hand, the principal's increased involvement in activities outside the school could detract from his or her time allotted to school issues. This could be interpreted by both teachers and pupils as a show of disinterest in school matters on the part of the principal, resulting in the pupil's failure to identify positively with the principal.

Conclusion 5: There were statistically significant relationships between principal leadership variables and student self-concept. Goal emphasis and interaction facilitation were found to be useful predictors of student self-security, social confidence, and peer affiliation. Interaction facilitation exhibited a consistently positive relationship with student self-concept, indicating that pupils held a positive image of themselves, reacted well in social situations, and identified well with other students as principals gave more encouragement to harmonious working relationships among staff. However, as principals were perceived as being more goal-oriented, a term very often associated with authoritarianism, the result was a negative correlation with student self-concept measures. The adversarial relationship exhibited by the leadership variables is difficult to grapple with since the two are not separate entities but are dimensions of the same Four-Factor construct of leadership. One would expect that these two dimensions would complement each other in their relationship to student outcome measures.

Conclusion 6: There was a statistically significant relationship between the way principals used their time and student self-concept scores. Although the principal's use of noninstructional time was not significantly related to student achievement, this variable was related to one student self-concept

variable, school affiliation. A negative relationship prevailed between the principal's preoccupation with noninstructional activities such as administration, evaluation, and record keeping, and the student's ability to identify positively with the school.

Conclusion 7: Whether the principal's influence on pupil outcomes is direct or whether it is mediated by teachers or by school climate was not determined in this study. It became clear in discussing the foregoing conclusions that greater knowledge of the exact nature of the principal's link to pupil outcomes is needed. Knowledge of this linkage is probably more critical in looking at student affective outcomes than in observing cognitive outcomes. For example, in the case of the relationship between the principal's utilization of noninstructional time and students' ability to positively identify with the school, it was unclear as to whether this relationship was transmitted to students directly through their contacts with the principal (e.g., seeing the principal in assembly or on the playground), through interactions of the principal with teachers which then transfers to students, or through the manner in which the principal influences the general atmosphere of the school through policy decisions. It was hoped that path analysis would provide the key to unlocking these mysteries. However, no significant links were found among

the variables posited in the model of the principal in the educational process. In fact, the only significant finding from the path analysis was that there is a strong, positive relationship between principal leadership and teacher job satisfaction. Other posited relationships simply did not hold. The explanation for the failure to obtain expected results may lie more in the specification of the model (especially the use of school size to represent school climate), than in the adequacy of the method itself.

To conclude this section, the following comments are warranted. In earlier chapters of this study, it was assumed that there are a number of factors that contribute to the production of education. It was further assumed that, among those school resources which are important for learning to occur, teachers probably play the leading role. A final assumption was that other resources, though not the prime movers in the educational process, were of some value in influencing student outcomes. Principals were included among those "other resources" and were the topic of interest for this study. It was found that principals do in fact make a difference. That is, three sets of principal-related variables--leadership, background, and utilization of noninstructional time--were found to be related to some student cognitive and affective outcomes. These findings lend credence to the belief that behaviors

(process variables) associated with the principal are important relative to pupil outcomes.

As in the case with many other studies, a number of questions were left unanswered in this study. The apparent adversarial relationships identified within families of variables relating to pupil outcomes were unexpected and the reasons for them remain to be answered. Why, for example, did goal emphasis exhibit a consistently negative relationship with student measures while interaction facilitation exhibited a consistently positive relationship with certain pupil outcomes? The exact linkages between principal, teacher, and pupil-related variables is another vexing problem left unsolved in this study. One would suspect, however, that a virtually infinite number of such linkages might exist, depending on what pupil outcome measures are being investigated. For example, in the case of cognitive outcomes, the principal might be indirectly influential through planning with teachers. On the other hand, in the case of affective outcomes, the effect of the principal is probably both direct and indirect through the manner in which he or she influences the school climate.

Implications

It must be emphasized that identification of implications for practice based on the findings of this study is not warranted. The exploratory nature of production function studies in general,

together with the conceptual and methodological imperfections of this study in particular, preclude sweeping generalizations on the basis of the results. Rather than offering definitive explanations for the phenomena observed here, this study concludes by pointing out some of the rather interesting relationships which were found and suggesting some avenues for future research.

First, the idea that the principal's leadership behavior, represented by the principal's goal emphasis, exhibited a negative relationship with student achievement is particularly disturbing. It has been suggested that perhaps this finding is a result of defects in the instrument used to measure leadership. One suggestion is to develop an instrument which would measure students' (rather than teachers') perceptions of the principal's leadership. Perhaps stronger relationships would be found between the principal's leadership behavior and student outcomes if such an instrument were available.

Secondly, study of other subsystems in the schooling process would seem warranted. In the present study, it has been found that some human capital inputs of the principal (such as participation in staff development workshops, and attendance at professional meetings) have an impact on students, as do some of the process variables represented by leader behavior and use of time. These variables are certainly within the control of school policy makers. It is possible that proper manipulation of these behaviors might

result in positive changes in student development. Similar studies of other human and material school resources might turn up valuable information.

In conjunction with the foregoing suggestions, additional studies using path analysis techniques might result in greater knowledge of the nature of certain relationships in the educational production system. Such knowledge would be of value in understanding more clearly the workings of the system which could, in turn, result in achieving greater productivity from the system.

A final suggestion for further study is that data be gathered on individual pupils so that school resources can be matched to the students who actually make use of them. In this way, researchers may be able to discover which school resources are most productive for pupils of differing characteristics.

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APPENDIX A

BACKGROUND INFORMATION AND ORGANIZATIONAL STRUCTURE SURVEY

184

Form Approved
OMB No: 51-375077
Approval Expires June 1976

BACKGROUND INFORMATION AND ORGANIZATIONAL STRUCTURE SURVEY

(Form T)

You are participating in a study conducted by the Wisconsin Research and Development Center for Cognitive Learning. The purpose of the instrument is to obtain background data and to determine the nature of the organizational structure in IGE Multiunit Elementary Schools.

This instrument to be completed by the unit, (team or learning community) teachers consists of 18 background items and 24 stratification and formalization items. Completion of the entire instrument should require about 20 minutes of your time. It is important that all items receive a response as any item left blank will give a distorted picture of your school. All responses will remain confidential and none will be identified by person, school, or school district.

Please answer the questions about each item by placing your response in the space provided. Upon completing the instrument please place it in the envelope provided and hold it for the researcher who will visit your school and pick up your sealed envelope of completed instruments.

Your participation in this study is sincerely appreciated.

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the National Institute of Education, Department of Health, Education and Welfare. The opinions expressed herein do not necessarily reflect the position of the National Institute of Education and no official endorsement by the National Institute of Education should be inferred.

BACKGROUND INFORMATION AND ORGANIZATIONAL SURVEY
(Form T)

Part I

Directions: Indicate the proper response in the space provided for each question.

____ 1. Highest level of professional preparation completed.

1. Bachelors Degree
2. Bachelors Degree + 16 credits
3. Masters Degree
4. Masters Degree + 16 credits
5. Masters Degree + 32 credits
6. Doctoral Degree

____ 2. Are you presently enrolled in a degree program?

1. Yes
2. No

____ 3. Have you given any presentations or written articles for professional organizations in the past 5 years?

1. Yes
2. No

____ 4. If yes to above question 3, indicate the approximate number.

____ 5. Sex
1. Female
2. Male

____ 6. Have you participated in a staff development workshop in which you were trained to implement IGE/MUS-E?

1. Yes
2. No

____ 7. Indicate the total number of years of your teaching experience.

____ 8. Indicate the total number of years that you have been a teacher in this district?

____ 9. Indicate the total number of years as a teacher in your present school.

____10. Indicate the total number of years you have been a teacher in an IGE school.

____11. Indicate the number of district committees of which you are a member (i.e., curriculum, SPC, in-service, etc.).

____12. Indicate the number of professional organizations to which you belong.

____13. Indicate the number of professional organization meetings you attend each school year.

____14. Indicate the number of offices that you hold or have held in the past 5 years in professional organizations.

____15. Indicate your age.

____16. How many times a week does your unit, team, or learning community meet?

____17. What amount of time does your unit, team, or learning community spend in planning and coordinating activities each week?

____18. Indicate the total years you have been a member of your present team, unit, or learning community.

Directions: Please circle the answer which best describes your situation.

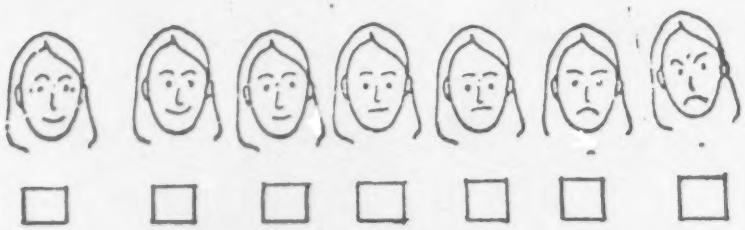
1 = To a very little extent
2 = To a little extent
3 = To some extent
4 = To a great extent
5 = To a very great extent

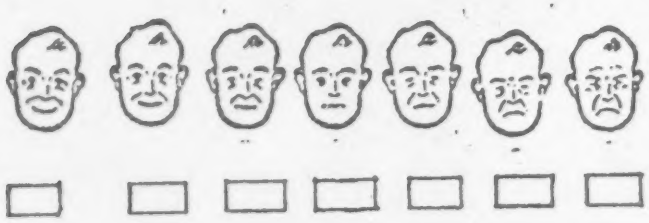
1. To what extent are you guided by written procedures or operational guidelines which specify how to do your job?	1	2	3	4	5
2. To what extent do you develop your own methods and procedures in doing your job?	1	2	3	4	5
3. To what extent is going through proper channels stressed in your school?	1	2	3	4	5
4. To what extent are school work rules and procedures explicitly defined?	1	2	3	4	5
5. To what extent are you expected strictly to follow rules and procedures?	1	2	3	4	5
6. To what extent are you hindered from doing your job by rules and regulations?	1	2	3	4	5

1 = To a very little extent
2 = To a little extent
3 = To some extent
4 = To a great extent
5 = To a very great extent

7. To what extent do you feel it is necessary to "work around" certain policies and regulations of the school?	1	2	3	4	5
8. To what extent do some teachers in your school get first choice of instructional materials than others?	1	2	3	4	5
9. To what extent do some teachers have fewer duties than others?	1	2	3	4	5
10. To what extent are some teachers not required to follow the rules and procedures as closely as others?	1	2	3	4	5
11. To what extent are some teachers assigned better teaching facilities than others?	1	2	3	4	5
12. To what extent do some teachers have more say regarding school policies than others?	1	2	3	4	5
13. To what extent do some teachers have more status than others?	1	2	3	4	5
14. To what extent do some teachers have a closer relationship with the administration than do others?	1	2	3	4	5
15. To what extent are some teachers better able to get what they want into the school budget than others?	1	2	3	4	5
16. To what extent are some teachers more readily accepted by their peers than others?	1	2	3	4	5
17. To what extent are some teachers allowed to spend more school money than others?	1	2	3	4	5
18. To what extent are some teachers respected by students and parents more than are others?	1	2	3	4	5
19. To what extent do some teachers have more prestige than others?	1	2	3	4	5

20. Please put a check under the face of the appropriate response set that best expresses your overall feelings about your school:





APPENDIX B

TIME UTILIZATION INSTRUMENT

TIME ALLOCATION OF INSTRUCTIONAL PERSONNEL

Instructions:

1. This form is designed to provide information about the utilization of time by staff members in I & R units. The form should be completed by each staff member of the I & R Unit and by the principal.

2. Please estimate as accurately as you can either:

   a) the number of hours per week you typically spend in the various activities listed on this form

   or

   b) the percentage of time per week you typically spend in the various activities listed on this form.

3. If you report your allocation of time in hours, the total of the hours in Category II--Direct Instruction of Pupils, and Category III--Activities Other Than Direct Instruction of Pupils, should equal the total amount of time, both in-school and out-of-school, that you devote to your job.

   If you report your time in percentage, the percentage of time in Category II--Direct Instruction of Pupils, and Category III--Activities Other Than Direct Instruction of Pupils, should total to 100%.

4. If you are not involved in a particular activity enter a zero (0).

5. If you are not directly involved in instruction of students, e.g., principal or secretary, you may disregard Section II of the form.

6. If you are directly involved in instruction of students, we are especially interested in the amount or percentage of time devoted to the various modes of instruction (for example, one-to-one, small group, large group, etc.) in the various areas of the curriculum. Your best estimate of the amount or percentage of your time spent in these various activities is sufficient; we do not expect "stop watch" accuracy in your estimates.

I. Please check your position.

_____ Principal	_____ Aide
_____ Unit leader	_____ Intern
_____ Unit teacher	_____ Unit secretary

II. Direct Instruction of Pupils

Direct instruction of students includes those activities in which you are directly involved in teaching students. Examples would include lecturing to a large group of students, showing a film, working with a small group of students on a particular skill, or working with an individual student in a task or giving directions to a student who will engage in independent study.

A. Please estimate the number of hours per week or percentage of time per week that you spend in this activity:

_____

B. Of the time you spend in direct instruction of students, please indicate how that time is allocated among the following curricular areas and modes of instruction:

Curriculum Area	Mode of Instruction: Independent Study or one-to-one	Small Group (3-5 students)	Class-size Group (25-35 students)	Large Group (75-150 students)
Reading				
Language Arts				
Mathematics				
Science				
Social Studies				
Other				

III. Activities Other Than Direct Instruction of Pupils

No. of Hours/Week or Percentage of Time in This Activity

A. Supervision of Pupils, e.g., recess, lunchroom, playground, etc. _____

B. Planning, e.g , instructional activities for pupils, activities of the entire unit, etc. _____

C. Testing/Assessing/Evaluating, e.g., activities associated with determining progress of pupils relative to established objectives. _____

3

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No. of Hours/Week or Percentage of Time in This Activity

D. Record Keeping, e.g., maintaining up-to-date records on each pupil's progress toward established objectives. _____

E. Inservice Training, e.g., schoolwide or system-wide activities designed to promote professional development of the staff. _____

F. Clerical/secretarial, e.g., typing tests and instructional materials, correcting papers and tests, mimeographing or duplicating materials, and similar activities. _____

G. Administrative, e g., activities such as supervision of instruction which support the instructional program but are not directly involved with it.

H. Other, any activities not identified in the above categories (please specify). _____

_____

_____

_____

_____

APPENDIX C

COMPREHENSIVE TEST OF BASIC SKILLS

Reference:

Comprehensive Test of Basic Skills, Level 2 Forms
Expanded Edition

CTB/McGraw-Hill, Del Monte Research Park,
Monterey, California, 1974

APPENDIX D

SCHOOL EXPENDITURE DATA INSTRUMENT

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SCHOOL EXPENDITURE DATA

Directions:

1. This form may be completed by:

   The school principal if accounting data for the school are available in the principal's office

   or by

   The school district's superintendent or business manager if accounting data for each school are available only in the district's central office.

2. The expenditure categories for which data are requested are those found in Financial Accounting for Local and State School Systems (Handbook II in the State Educational Records and Reports Series published by the U.S. Office of Education).

3. Attached to this form are descriptions and definitions of the various expenditure categories.

4. We realize that not all school districts maintain complete financial records on a school-by-school basis. For this reason we are requesting data only for expenditure categories that are most likely to be maintained at the school level. It is hoped that the school or school district will be able to provide reasonably accurate information on the expenditures in these categories for the school.

5. The expenditure data requested are for the 1974-75 school year.

6. If questions should arise concerning the completion of this form, please do not hesitate to call collect Terry Geske at 608/263-4270 or Richard Rossmiller at 608/263-4200.

	Total School
I. Instruction	
A. Salaries	
Principal(s)	_____
Teachers	_____
Other certificated professional staff	_____
Secretarial and clerical	_____
Other salaries	_____

	Total School
B. Supplies and Materials	
Instructional supplies and materials	_____
Other supplies and materials	_____
C. Textbooks, Library and Audiovisual	
Textbooks	_____
Library books	_____
Periodicals and newspapers	_____
Audiovisual materials	_____
Other	_____
D. Other Expenses	
Travel	_____
Expenses of inservice education	_____
Other expenses	_____
II. Operation of Plant	
A. Salaries	
Plant engineers	_____
Custodians	_____
B. Supplies and Materials	_____
C. Utilities	_____
D. Other Expenses	_____
III. Repairs to Plant and Equipment	_____
IV. Capital Outlay	
Replacement of instructional equipment	_____
Addition to instructional equipment	_____

V. General Information:

1. Please indicate the average salary paid the following categories of district employees during the 1974-75 school year.

   Elementary school (Grades K-6) teachers _____

   Elementary school principals _____

   Instructional aides _____

   Secretarial and/or clerical personnel _____

2. Fringe benefits represent a significant expenditure item in most school districts. Please estimate as accurately as possible the average cost to the district of the fringe benefits (restaurant, social security, health insurance, life insurance, etc.) provided for the typical employee in each of the following categories during the 1974-75 school year.

   Elementary school (Grades K-6) teachers _____

   Elementary school principals _____

   Instructional aides _____

   Secretarial and/or clerical personnel _____

3. If the district has multiunit IGE schools, please indicate the average amount of additional compensation, if any, that a unit leader receives.

   _____

4. School districts sometimes establish guidelines for allocating funds for instructional supplies amd materials, textbooks, library books, etc. If your district has such a policy, please indicate the amount allocated per pupil, per teacher, or per school for supplies, materials, etc. or indicate the basis on which such allocations are made.

   _____

   _____

   _____

   _____

   _____

Definition of Expenditure Categories

Following are specific definitions which should help clarify the costs to be included within each expenditure category:

I. Instruction

Instruction consists of those activities dealing directly with or aiding in the teaching of students or improving the quality of instruction. Examples are the activities of teachers, principals, consultants, or supervisors of instruction, and guidance and psychological personnel.

A. Salaries

Principals - The full-time, part-time, and prorated portions of salaries of principals, assistant principals, and other personnel performing the administrative duties of a principal. Salaries of principals who teach classes are prorated to this account in proportion to the time devoted to the coordination and supervision of the activities of the schools.

Teachers - The full-time, part-time and prorated portions of salaries for all teaching services rendered to pupils in the public schools, including the salaries of substitute teachers.

Other Certificated Instructional Staff - The full-time, part-time and prorated portion of salaries for services rendered by school librarians, television instructional personnel, audiovisual personnel, guidance personnel, psychologists and psychometrists.

Secretarial and Clerical - The full-time, part-time and prorated portions of salaries for secretarial and clerical assistants to instructional personnel.

Other Salaries - The full-time, part-time and prorated portions of salaries for any non-certificated assistants or aides to instructional staff other than secretarial and clerical personnel, such as lay readers, study hall teachers, theme graders, etc.

B. Supplies and Materials

Instructional - Expenditures for all supplies and materials which are actually or constructively consumed in the instructional program, including the freight and cartage costs, are recorded here.

Examples of such supplies include chalk, paper, test tubes, ink, pencils, paint brushes, paints, chemicals, shop supplies for vocational courses, oils, cleaners, music supplies, supplies for operation of equipment used in instructional programs (typewriter ribbons, etc.), workbooks, physical education supplies, printing of classroom materials, periodicals for classroom use (not library).

Other Supplies and Materials - Expenditures for all supplies used by teachers other than those actually used in the instructional program are recorded here. Examples of such expenditures include stationery, postage, desk supplies, etc.

C. Textbooks, Library and Audiovisual

Textbooks - Expenditures for replacement of textbooks furnished free to all public school pupils, bindings and other textbook repairs, and freight and cartage of textbooks. Purchase of textbooks rented to the students are also included here.

Library Books - Expenditures for regular or incidental purchases of school library books available for general use by students. Other expenditures included in this account are costs of binding, other book repairs, and shipping charges for school library books.

Periodicals and Newspapers - Expenditures for periodicals and newspapers for general use by the school library. (A periodical is any publication appearing at regular intervals of less than a year and continuing for an indefinite period.)

Audiovisual Materials - Expenditures for audiovisual materials (not equipment) used in the instructional programs, such as films, filmstrips, recordings, exhibits, charts, maps, and television and radio materials, including the rental of such materials.

Other Expenses - Expenditures for library services in lieu of maintaining a school library and for school library supplies such as paper, pencils, index cards, and other office supplies.

D. Other Expenses

Travel - Expenditures for the travel of all instructional personnel and their assistants, including travel in connection with the everyday instructional activities and travel to conventions, meetings, institutes, and workshops. This includes meals, lodging, registration fees, etc.

Expenses of Inservice Education - Expenses of workshops, professional libraries, convention expenses, reimbursement of expenses for attending summer school and extension courses, etc.

Other Expenses - Miscellaneous expenditures incurred for the instructional program for such things as graduation expenses, assembly speakers, field trips, etc.

II. Operation of Plant

Operation of plant consists of the housekeeping activities concerned with keeping the physical plant open and ready for use. It includes cleaning, disinfecting, laundering, dry cleaning, heating, lighting, communications, power, moving furniture, handling stores, caring for grounds, and other housekeeping activities that are repeated somewhat regularly on a daily, weekly, monthly, or seasonal basis. Operation of plant does not encompass the repair and replacement of facilities and equipment.

A. Salaries

Plant Engineers - The full-time, part-time, and prorated portions of salaries of personnel responsible for supervising the staff servicing buildings.

Custodians -The full-time, part-time, and prorated portions of salaries of custodians, firemen, custodians' helpers, matrons, general utility men, night watchmen, and other such personnel who sweep, clean, polish, mop, care for grounds, operate the heating and ventilating systems, and perform any other housekeeping duties. Salaries of custodians performing maintenance activities during vacation periods should be prorated between this account and Maintenance of Plant.

B. Supplies and Materials

Expenditures for brooms, mops, soap, dusters, electrical fuses, electric light bulbs, fluorescent tubes, paper towels, hand towels, floor wax, bath towels, paper cups, toilet paper, and other such consumable custodial supplies.

C. Utilities

Heat for Buildings - Expenditures for all coal, steam, electricity, gas, gasoline, fuel oil, and wood used for heating, including transportation costs involved. If electricity and gas are used for heating and other purposes and if the bills cannot be divided between heat and other utilities, the expenditure should be recorded under this account.

Gas (Not Heat) - All expenditures for gas for any use other than heating buildings should be recorded here.

Water and Sewage - Expenditures paid to municipal governments for water and sewage service. Include cost of supplies such as chemicals for water or sewer treatment when the school district maintains its own water and sewer system.

Electricity - All expenditures for electricity except electricity used for heating buildings should be recorded here.

Telephone and Telegraph - Expenditures for telephone and telegraph, including rental of the telephone switchboards are recorded here.

D. Other Expenses

Reimbursement of expenses for travel by plant operation personnel in the performance of their jobs and in attending workshops, etc. Meals, lodging, registration fees, etc., are also recorded here.

III. Repairs to Plant and Equipment

Plant maintenance consists of those activities that are concerned with keeping the grounds, buildings, service systems, furniture and equipment in good repair. Repairs to capital items consist of expenditures for contracted services, salaries, and wages of school employees engaged for that purpose, materials, and supplies used in the repair of existing buildings, grounds, service systems, furniture and other equipment. Expenditures which add to existing furniture and equipment inventories and/or include replacements of equipment, major integral units of buildings or mechanical systems and expenditures for site improvement replacements, are not recorded under the Capital Outlay accounts, if they are not a part of a building construction, major remodeling or site improvement project.

The following general guide is suggested for the allocation of expenditures for maintenance of buildings and service systems: Expenditures which are incurred to repair existing partitions walls, ceilings, roof structures, ducts, vents, windows, light fixtures, boilers, etc., which do not result in changes in these kinds of intergral units of the buildings, service systems, and the integral unit has not been totally replaced, the expenditure shall be recorded as maintenance. If an integral unit has been replaced in its entirety, and is not a part of a remodeling project, the expenditure ordinarily will be recorded in the Capital Outlay account.

IV. Capital Outlay

Capital Outlay expenditures are those which result in the acquisition of new fixed assets or additions or improvements to existing fixed assets.

Instructional Equipment - Expenditures to furnish and equip a newly constructed or remodeled building for instruction are recorded here. Instructional equipment is that used by pupils, teachers, principals and supervisors of instruction in the instructional program and is not a built-in item. Some examples of instructional equipment are: desks, workbenches, shop machinery and tools, musical instruments, typewriters, business machines, phonographs, radios, motion picture projectors, sewing machines, science laboratory apparatus, encyclopedia sets, unabridged dictionaries, physical education appartus, and other equipment used in the instructional program.

APPENDIX E

PRINCIPAL LEADERSHIP ASSESSMENT

Form Approved
OMB No: 51-S75077
Approval Expires June 1976

PRINCIPAL LEADERSHIP ASSESSMENT

You are participating in a study conducted by the Wisconsin Research and Development Center for Cognitive Learning. The purpose of this instrument is to determine the nature of the principal's leadership in IGE Multiunit Elementary Schools.

This instrument to be completed by the unit (team or learning community) leader and staff teachers consists of 24 leadership items. The items are used in this study by permission of Dr. David G. Bowers and are adapted from the Survey of Organizations Questionnaire developed by the Institute for Social Research, The University of Michigan Organizational Development Research Program. Completion of the entire instrument should require about 10 minutes of your time. It is important that all items receive a response as any item left blank will give a distorted picture of your school. All responses will remain confidential and none will be identified by person, school, or school district.

Please answer the questions about each item by placing your response in the space provided. Upon completing the instrument please place it in the envelope provided and hold it for the researcher who will visit your school and pick up your sealed envelope of completed instruments.

Your participation in this study is sincerely appreciated.

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the National Institute of Education, Department of Health, Education and Welfare. The opinions expressed herein do not necessarily reflect the position of the National Institute of Education and no official endorsement by the National Institute of Education should be inferred.

PRINCIPAL LEADERSHIP ASSESSMENT

Directions:

Indicate your feelings concerning the leadership of the principal of your school. For each item please answer by circling the number in the column most accurately describing your feelings.

1 = To a very little extent
2 = To a little extent
3 = To some extent
4 = To a great extent
5 = To a very great extent

1. How friendly and easy to approach is your principal?	1	2	3	4	5
2. When you talk with your principal to what extent does he/she pay attention to what you're saying?	1	2	3	4	5
3. To what extent is your principal willing to listen to your problems?	1	2	3	4	5
4. How much does your principal encourage people to give their best effort?	1	2	3	4	5
5. To what extent does your principal maintain high standards of performance?	1	2	3	4	5
6. To what extent does your principal show you how to improve your performance?	1	2	3	4	5
7. To what extent does your principal provide the help you need so that you can schedule work ahead of time?	1	2	3	4	5
8. To what extent does your principal offer new ideas for solving job related problems?	1	2	3	4	5
9. To what extent does your principal encourage the persons who work for him/her to work as a team?	1	2	3	4	5
10. To what extent does your principal encourage people who work for him/her to exchange opinions and ideas?	1	2	3	4	5
11. To what extent do you feel your principal has confidence and trust in you?	1	2	3	4	5
12. To what extent do you have confidence and trust in your principal?	1	2	3	4	5

1 = To a very little extent
2 = To a little extent
3 = To some extent
4 = To a great extent
5 = To a very great extent

13. To what extent does your principal handle the technical side of his/her job--for example, general expertness, knowledge of job, technical skills needed in the profession? 1 2 3 4 5

14. To what extent does your principal do a good job of representing your work group to other units? ("Represent" means telling others about what your group has done and can do, as well as explaining the problems facing it and its readiness to do things.) 1 2 3 4 5

In order to be an effective leader, a principal needs certain kinds of information, skills, values, and situations. To what extent does your principal have each of the following:

15. Information about his/her people see and feel about things? 1 2 3 4 5

16. Knowledge of what it takes to be a good leader? 1 2 3 4 5

17. An attitude which encourages participation and commitment from those who work for him/her? 1 2 3 4 5

18. Administrative Skills? 1 2 3 4 5

19. Skills for getting along with others? 1 2 3 4 5

20. A work situation which allows him/her to be a good leader? 1 2 3 4 5

21. Interest and concern for the people who work for him/her? 1 2 3 4 5

When it is necessary for decisions to be made that affect your work group, to what extent does your principal/unit leader do each of the following <u>before</u> final decisions are made?

22. Provide the members of your work group with information about the decisions? 1 2 3 4 5

23. Ask for opinions and ideas from members of your work group? 1 2 3 4 5

24. Meet with his/her teachers <u>as a group</u>, present problems that must be solved and work with the group to find solutions? 1 2 3 4 5

APPENDIX F

JOB SATISFACTION SURVEY

Form Approved
OMB No: 51-S75077
Approval Expires June 1976

JOB SATISFACTION SURVEY

You are participating in a study conducted by the Wisconsin Research and Development Center for Cognitive Learning. The purpose of this instrument is to determine the nature of job satisfaction in IGE Multiunit Elementary Schools.

This instrument to be completed by the unit (team or learning community) leader and staff teachers consists of 50 job satisfaction items. Completion of the entire instrument should require about 30 minutes of your time. It is important that all items receive a response as any item left blank will give a distorted picture of your school. All responses will remain confidential and none will be identified by person, school, or school district.

Please answer the questions about each item by placing your response in the space provided. Upon completing the instrument please place it in the envelope provided and hold it for the researcher who will visit your school and pick up your sealed envelope of completed instruments.

Your participation in this study is sincerely appreciated.

Published by the Wisconsin Research and Development Center for Cognitive Learning, supported in part as a research and development center by funds from the National Institute of Education, Department of Health, Education and Welfare. The opinions expressed herein do not necessarily reflect the position of the National Institute of Education and no official endorsement by the National Institute of Education should be inferred.

JOB SATISFACTION SURVEY

Directions: Please indicate your feelings of satisfaction with your situation. For each item please answer by circling the number in the column most accurately describing your feelings.

1 = Not satisfied
2 = Somewhat satisfied
3 = Satisfied
4 = Quite satisfied
5 = Very satisfied

How satisfied are you with:

1. the professional competence and leadership of your building administrators?	1 2 3 4 5
2. the ability of your building administrators to encourage people to work together?	1 2 3 4 5
3. the manner in which school policies and regulations are enforced?	1 2 3 4 5
4. the recognition you receive from your building administrators for your teaching achievements?	1 2 3 4 5
5. the procedures used to evaluate teachers in your school?	1 2 3 4 5
6. the fairness of the building administration in the assigning of extra duties?	1 2 3 4 5
7. the opportunities provided to discuss problems with building administrative personnel?	1 2 3 4 5
8. the trust you have in your building administrators?	1 2 3 4 5
9. the administrators' trust in you?	1 2 3 4 5
10. the innovativeness of your building administrators?	1 2 3 4 5
11. the personal and social relationships you have with other teachers?	1 2 3 4 5
12. the recognition you get from other teachers for your work?	1 2 3 4 5
13. the quality of work of other teachers in your school?	1 2 3 4 5
14. the amount of work done by other teachers in your school?	1 2 3 4 5

1 = Not satisfied
2 = Somewhat satisfied
3 = Satisfied
4 = Quite satisfied
5 = Very satisfied

How satisfied are you with:

15. teaching, in light of what you expected to be doing as a teacher? 1 2 3 4 5
16. your future in your school district? 1 2 3 4 5
17. your opportunities for growth in your profession? 1 2 3 4 5
18. your school as an organization to work for? 1 2 3 4 5
19. the professionalism your school district shows toward teachers? 1 2 3 4 5
20. the degree of your involvement in your school? 1 2 3 4 5
21. the general reputation of your school? 1 2 3 4 5
22. the opportunities that you have to influence school policy? 1 2 3 4 5
23. your awareness of what is "going on" in your school? 1 2 3 4 5
24. the goals emphasized by your school? 1 2 3 4 5
25. the amount of money you make? 1 2 3 4 5
26. the salary schedule and fringe benefits in your school district? 1 2 3 4 5
27. the physical facilities of your school? 1 2 3 4 5
28. the number of students accommodated in your school? 1 2 3 4 5
29. the availability of appropriate instructional materials and equipment? 1 2 3 4 5
30. the arrangement of space and equipment in your school? 1 2 3 4 5
31. the amount of preparation time provided for teachers in your school? 1 2 3 4 5
32. the custodial services provided in your school? 1 2 3 4 5
33. the quality of the work you do? 1 2 3 4 5
34. the extent to which you are motivated by your job? 1 2 3 4 5

1 = Not satisfied
2 = Somewhat satisfied
3 = Satisfied
4 = Quite satisfied
5 = Very satisfied

How satisfied are you with:

35. the freedom that you have to experiment with instructional methods? 1 2 3 4 5

36. the intellectual stimulation that you receive from your work? 1 2 3 4 5

37. the opportunities that you have to teach in your major areas of interest? 1 2 3 4 5

38. the amount of work you are expected to do? 1 2 3 4 5

39. the amount of time that you actually spend in teaching? 1 2 3 4 5

40. the total time that you spend with students? 1 2 3 4 5

41. the number of students for whom you are responsible? 1 2 3 4 5

42. the extent to which you are able to meet your students' academic needs? 1 2 3 4 5

43. the extent to which you are able to meet your students' affective needs? 1 2 3 4 5

44. the quality of your interactions with your students? 1 2 3 4 5

45. the extent to which the community recognizes and appreciates its educators? 1 2 3 4 5

46. the adequacy of financial support provided your school by the community? 1 2 3 4 5

47. the understanding of your school's program by parents and the community? 1 2 3 4 5

48. the community's involvement in your school's program? 1 2 3 4 5

49. the methods used to communicate with the community about your school? 1 2 3 4 5

50. the methods used to report student progress to parents? 1 2 3 4 5

APPENDIX G

SELF-OBSERVATION SCALES

Reference:

Katzenmeyer, W. G., & Stenner, A. D. Self-Observation Scales, Intermediate Level. Durham, North Carolina: National Testing Service, 1973.

APPENDIX H

PRODUCT-MOMENT CORRELATIONS OF SELECTED INDEPENDENT AND DEPENDENT VARIABLES

PRODUCT-MOMENT CORRELATIONS OF SELECTED

INDEPENDENT AND DEPENDENT VARIABLES

	VOCAB	COMPREH	READ	MATHCOMP	MATHCONC	MATHAPPL	MATH
PBIQ1	-.080	-.117	-.090	-.133	-.204	-.225	-.173
PBIQ2	.180	.169	.179	.054	.159	.162	.105
PBIQ5	.345	.348	..350	.094	.149	.218	.148
PBIQ6	-.131	-.030	-.071	-.018	-.034	.022	.008
PBIQ10	.213	.124	.155	.293	.273	.379	.326
PBIQ11	.174	.136	.155	.202	.084	.156	.158
PBIQ13	-.197	-.235	-.229	-.251	-.241	-.252	-.254
PBIQ15	-.142	-.122	-.127	.072	-.052	-.161	-.023
PINSTR	.152	.150	.147	.040	.060	.106	.066
PNON	.053	.069	.059	.099	.067	.055	.077
PBIQ17	-.083	-.149	-.125	.115	.101	.066	.109
SUPPORT	.051	.170	.106	-.087	.160	.085	.027
GOAL	-.135	-.080	-.116	-.355	-.068	-.119	-.232
WRKFAC	-.095	-.035	-.073	-.269	.020	-.047	-.149
INTRFAC	.052	.109	.069	.040	.109	.063	.012
PRLDRSHP	-.041	.046	-.006	-.226	.068	-.006	-.102

	ACCEPT	SECURITY	MATURITY	CONFIDNT	SCHLAFFIL	TCHAFFIL	PEERAFFIL
PBIQ1	-.205	-.266	-.150	-.305	-.172	-.293	-.199
PBIQ2	.019	-.205	.162	-.007	-.201	.094	-.054
PBIQ5	.018	-.033	.253	.139	-.257	.158	.075
PBIQ6	.333	.059	.079	.093	.194	.267	.116
PBIQ10	.013	.284	.110	.249	-.070	.055	.145
PBIQ11	.130	.280	.266	.131	-.387	.071	.236
PBIQ13	-.316	-.283	-.262	-.364	-.158	-.392	-.343
PBIQ15	-.114	.184	-.165	.028	.134	-.228	.015
PINSTR	.102	.153	.057	-.251	-.072	.015	.056
PNON	-.283	-.018	-.014	-.039	-.429	-.227	-.204
SUPPORT	.052	-.025	.120	.076	.054	.201	-.057
GOAL	-.026	-.159	-.058	-.143	.138	-.002	-.159
WRKFAC	.183	-.167	-.016	.027	.288	.141	-.003
INTRFAC	.278	.344	.148	.210	.194	.214	.216
PRLDRSHP	.136	-.041	.050	.044	.202	.163	-.016
TCHJSAT	.111	-.030	.266	.160	-.069	.248	.019

APPENDIX I

PRODUCT-MOMENT CORRELATIONS OF VARIABLES

INITIALLY SELECTED FOR USE IN THE PRINCIPAL'S PRODUCTION FUNCTION

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Product-Moment Correlations of Variables

Initially Selected for Use in the Principal's Production Function

ABLE NO. NAME	1 PBIQ1	2 PBIQ2	3 PBIQ3	4 PBIQ4	5 PBIQ5	6 PBIQ6	7 PBIQ7	8 PBIQ8	9 PBIQ9	10 PBIQ10	11 PBIQ11	12 PBIQ12
PBIQ1	1.000											
PBIQ2	.014	1.000										
PBIQ3	.360	.091	1.000									
PBIQ4	-.364	.187	-.044	1.000								
PBIQ5	-.050	.076	-.042	-.474	1.000							
PBIQ6	.124	.141	-.017	-.149	-.140	1.000						
PBIQ7	-.008	.003	.137	.403	-.379	-.101	1.000					
PBIQ8	-.361	.198	-.141	.324	-.135	-.085	.561	1.000				
PBIQ9	-.244	.039	-.082	.075	.228	-.213	.256	.644	1.000			
PBIQ10	-.155	-.012	-.219	-.172	.250	-.130	-.071	.134	.360	1.000		
PBIQ11	-.495	.243	-.164	.520	.071	-.254	.185	.441	.259	.097	1.000	
PBIQ12	.199	-.140	.041	.266	.004	-.195	-.136	-.121	.126	.262	.230	1.000
PBIQ13	-.013	-.188	-.119	.356	-.161	-.134	-.244	-.139	.021	.202	.101	.628
PBIQ14	-.072	-.385	-.262	-.058	.072	-.160	-.132	-.060	.224	.578	.245	.491
PBIQ15	.029	-.204	.112	.314	-.468	-.037	.902	.508	.181	-.129	.018	-.192
PBIQ16	.134	.130	-.137	-.161	.446	.224	-.832	-.336	-.072	.003	-.184	.102
PBIQ17	.192	-.157	-.307	-.166	-.280	.039	.049	-.106	-.104	.437	-.268	.216
PBIQ18	.319	-.034	.038	.268	-.071	.239	-.098	-.267	-.143	-.025	-.353	.140
PBIQ19	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
PBIQ20	.273	-.052	.227	-.493	.189	-.059	-.199	-.236	-.159	.022	-.410	-.307
PINSTR	-.035	.132	.146	.219	.150	-.112	-.130	.019	.183	.248	.245	.245
PNON	.095	.112	-.129	.040	-.002	-.208	-.182	-.055	-.186	.041	.142	.278
PIIIA	.084	-.302	-.218	-.236	.004	-.258	-.093	-.145	.080	.162	.003	.314
PIIIB	-.180	-.020	.173	-.135	.284	-.072	-.041	.138	.094	.195	.184	.071
PIIIC	-.010	-.043	.180	.199	.057	.089	.318	.319	.201	.013	.184	.133
PIIID	.223	-.198	-.126	-.188	.155	.394	-.213	-.054	.057	-.129	-.130	.115
PIIIE	-.328	.124	-.295	.351	-.291	.073	.817	.234	-.171	-.227	.378	-.057
PIIIF	.133	-.032	.059	.188	.015	.891	.147	.035	.125	.077	.096	.137
PIIIG	.078	.180	-.153	.174	-.051	-.188	-.094	-.094	-.129	.180	-.113	.077
PIIIH	.133	.060	.184	-.165	.012	-.229	-.147	-.097	-.142	-.146	.176	.175
PRSAL	.001	.007	.253	.127	-.037	-.164	.457	.442	.063	.154	.262	.166
ACCEPT	-.285	.019	-.013	.146	.018	.333	.823	-.228	-.063	.013	.130	-.159
SECURITY	-.266	-.205	-.094	.168	-.033	.059	.189	.088	.116	.284	.280	-.168
MATURITY	-.150	.162	.047	.133	.253	.079	.063	-.002	.162	.110	.266	-.059
COMPIDNT	-.305	-.007	-.068	-.125	.139	.893	.212	.130	.191	.269	.131	-.140
SCHAFFIL	-.172	-.201	.019	-.092	-.257	.194	-.086	-.248	-.313	-.070	-.387	-.308
TCHAFFIL	-.293	.094	.093	.061	.158	.267	-.120	-.162	-.028	.055	.071	-.210
PEERAFFL	-.199	-.054	-.016	.110	.075	.216	.170	-.011	.196	.148	.236	-.142
VOCAB	-.080	.180	-.001	-.080	.345	-.131	.062	-.089	.230	.213	.174	-.063
COMPREH	-.117	.169	.008	-.029	.348	-.030	.085	-.032	.168	.124	.136	-.131
READ	-.090	.179	.002	-.085	.358	-.071	.066	-.016	.196	.155	.155	-.108
MATHCOMP	-.133	.084	-.059	-.213	.094	-.018	.180	.088	.144	.293	.202	-.102
MATHCONC	-.204	.159	-.030	-.137	.149	-.034	.141	.061	.221	.273	.084	-.043
MATHAPPL	-.228	.162	-.033	-.197	.218	.022	.023	.084	.214	.379	.156	-.125
MATH	-.173	.105	-.048	-.192	.148	.008	.124	.085	.180	.328	.158	-.093
SUPPORT	-.318	.045	.367	.135	.100	-.106	-.052	-.111	-.140	-.124	-.082	-.128
GOAL	-.141	-.138	.898	.206	-.118	-.191	-.161	-.315	-.158	-.155	-.289	.020
WRKFAC	-.244	-.006	.142	.264	-.205	.175	.026	-.207	-.138	-.184	-.330	-.084
INTRFAC	-.422	.016	.073	.320	-.118	-.084	-.038	-.246	-.214	.086	.037	-.041
PRLORSHP	-.321	-.017	.265	.271	-.130	-.017	-.084	-.243	-.160	-.134	-.220	-.079
TCHJSAT	-.189	.218	.807	.193	.225	-.036	-.231	-.318	-.128	.064	-.218	.041

	PBIQ13	PBIQ14	PBIQ15	PBIQ16	PBIQ17	PBIQ18	PBIQ20	PINSTR	PNON	PIIIA	PIIIB	PIIIC	PIIID	PIIIE	PIIIF	PIII0
PBIQ13	1.000															
PBIQ14	.455	1.000														
PBIQ15	-.190	-.207	1.000													
PBIQ16	.134	-.013	-.543	1.000												
PBIQ17	.425	.393	.140	-.304	1.000											
PBIQ18	.402	.069	.008	.200	.311	1.000										
PBIQ19	.000	.000	.000	.000	.000	.000										
PBIQ20	-.381	-.185	-.139	-.016	-.105	-.054	1.000									
PINSTR	.244	-.102	-.183	.054	-.167	-.084	.084	1.000								
PNON	.172	.026	-.253	.163	-.068	.023	-.273	.041	1.000							
PIIIA	.152	.227	.012	-.057	.195	.153	-.001	-.162	.342	1.000						
PIIIB	-.091	.082	-.132	.209	-.290	-.165	.305	.118	.188	.102	1.000					
PIIIC	-.081	.082	.134	.098	-.305	-.123	-.093	.060	.174	.104	.667	1.000				
PIIID	.029	.031	-.201	.530	-.294	-.011	-.233	-.004	.145	.032	.083	.442	1.000			
PIIIE	.126	-.051	-.005	-.013	-.225	-.094	-.192	-.038	.534	-.008	.149	.109	.090	1.000		
PIIIF	-.163	-.193	.070	.072	-.206	.113	-.010	.614	.075	.047	.013	.140	.152	-.120	1.000	
PIII0	.145	-.089	-.142	.269	-.068	.191	-.295	.082	.678	.005	-.238	-.190	.075	.358	.169	1.000
PRSAL	-.014	.139	.422	-.447	.137	-.186	-.152	.034	.095	-.247	.190	.193	-.138	.116	-.113	-.242
ACCEPT	-.316	.151	-.114	.071	-.247	-.144	-.007	.102	-.283	-.332	.066	-.048	.075	.015	.256	-.104
SECURITY	-.283	.102	.184	-.127	-.103	-.078	-.081	.153	-.018	-.106	.007	-.089	-.163	.063	.392	-.202
MATURITY	-.262	.211	-.165	.055	-.283	-.119	-.027	.087	-.014	-.368	.061	-.038	-.072	.020	.180	.095
CONFIDNT	-.364	.308	.028	-.124	-.018	-.242	.006	-.251	-.039	-.218	.161	-.033	-.247	.074	-.024	-.017
SCHAFFIL	-.158	-.270	.134	-.093	.074	-.024	.293	-.072	-.429	.099	.025	-.179	-.053	-.060	-.139	-.083
TCHAFFIL	-.392	.083	-.228	.115	-.340	-.164	.114	.015	-.227	-.391	.190	-.146	-.015	.035	.085	-.283
PEERAFFL	-.343	.282	.015	-.016	-.233	-.161	-.029	.056	-.204	-.368	.015	-.052	-.024	.045	.296	-.176
VOCAB	-.197	.286	-.142	-.049	-.083	.012	.147	.152	.053	-.136	.181	-.108	-.331	.009	.163	-.059
COMPREH	-.235	.167	-.122	-.005	-.149	.011	.109	.130	.069	-.210	.192	-.095	-.267	.061	.167	-.016
READ	-.229	.215	-.127	-.024	-.185	.012	.125	.147	.059	-.187	.177	-.107	-.291	.038	.169	.006
MATHCOMP	-.251	.241	.072	-.126	.115	-.035	-.136	.040	.099	.051	.003	-.169	-.250	.052	.320	.000
MATHCONC	-.241	.171	-.082	-.126	.101	-.007	-.022	.060	.067	-.020	.143	-.130	-.371	-.036	.287	.048
MATHAPPL	-.252	.263	-.161	-.052	.066	-.004	.020	.106	.055	-.121	.258	-.067	-.277	.008	.297	-.008
MATH	-.254	.238	-.023	-.098	.109	-.014	-.068	.086	.077	-.040	.115	-.141	-.287	.015	.320	.001
SUPPORT	-.104	-.423	-.103	-.089	-.271	-.243	-.047	.232	.200	-.189	.276	.100	-.195	-.052	.018	.022
GOAL	.197	-.225	.234	-.143	-.073	-.017	.036	.195	.066	-.136	.041	.028	-.133	-.094	-.026	.111
WRKFAC	.131	-.127	-.076	-.204	.055	.114	-.115	-.085	-.150	-.205	-.039	.060	-.103	-.010	-.170	.159
INTRFAC	.070	-.025	-.155	-.217	-.023	-.172	-.136	.195	.066	-.190	.005	-.034	-.337	.067	-.036	.045
PRLORSHP	.079	-.250	-.182	-.190	-.091	-.077	-.079	.131	.038	-.214	.088	.053	-.209	-.031	-.074	.183
TCHJSAT	.012	-.214	-.394	-.043	-.029	.029	.033	.186	.188	-.233	.042	-.132	-.257	-.143	-.053	.131
																.239

APPENDIX J

SUMMARY OF STEPS FOR STEPWISE MULTIPLE REGRESSION EQUATIONS

TABLE J-1

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SELF-ACCEPTANCE

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PBIQ17	.4948	.2448	-.0292	.346	4
2	PNON	.4341	.1884	-.0292	.193	3
3	INTRFAC	.3327	.1106	-.0778	.134	2

TABLE J-2

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SELF-SECURITY

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Value	No. of Variables in Equation
1	PNON	.6587	.4338	-.0001	.950	5
2	PBIQ5	.6567	.4312	-.0026	.748	4
3	PBIQ13	.6234	.3886	-.0426	.192	3

TABLE J-3

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SOCIAL CONFIDENCE

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.5421	.2938	-.0000	.971	5
2	PBIQ5	.5325	.2835	-.0103	.568	4

TABLE J-4

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TEACHER AFFILIATION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	GOAL	.5097	.2597	-.0125	.544	5
2	PBIQ5	.4931	.2431	-.0166	.480	4
3	PNON	.4608	.2123	-.0308	.333	3
4	INTRFAC	.3918	.1535	-.0588	.184	2

TABLE J-5

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON PEER AFFILIATION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables In Equation
1	PBIQ5	.5642	.3183	-.0019	.805	5
2	PNON	.5402	.2918	-.0265	.354	4
3	PBIQ13	.4606	.2121	-.0796	.114	3

TABLE J-6

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON SCHOOL AFFILIATION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PBIQ13	.7035	.4949	-.0008	.857	6
2	PBIQ5	.6864	.4711	-.0237	.320	5
3	GOAL	.6601	.4357	-.0354	.227	4
4	INTRFAC	.6103	.3724	-.0633	.114	3

TABLE J-7

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON READING VOCABULARY

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.4280	.1831	-.0054	.706	5
2	PBIQ13	.4136	.1710	-.0121	.565	4
3	INTRFAC	.3576	.1278	-.0432	.275	3
4	GOAL	.3449	.1189	-.0090	.617	2

TABLE J-8

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON READING COMPREHENSION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.4501	.2025	-.0087	.627	5
2	GOAL	.4240	.1797	-.0228	.426	4
3	INTRFAC	.3922	.1538	-.0259	.393	3
4	PBIQ13	.3477	.1208	-.0329	.333	2

TABLE J-9

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON TOTAL READING

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.4418	.1951	-.0071	.662	5
2	PBIQ13	.4175	.1743	-.0209	.447	4
3	GOAL	.3675	.1350	-.0393	.296	3
4	INTRFAC	.3503	.1227	-.0123	.556	2

TABLE J-10

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON MATH COMPUTATION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PBIQ5	.4931	.2431	-.0015	.836	5
2	PNON	.4718	.2225	-.0206	.436	4
3	PBIQ13	.4429	.1961	-.0264	.375	3
4	INTRFAC	.3554	.1263	-.0698	.153	2

TABLE J-11

SUMMARY OF STEPS: STEPWISE REGRESSION OF SELECTED PRINCIPAL VARIABLES ON MATH APPLICATIONS

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.1762	.0310	-.0018	.826	5
2	INTRFAC	.1628	.0265	-.0134	.546	4
3	GOAL	.1603	.0256	-.0025	.790	3
4	PBIQ5	.1440	.0207	-.0163	.493	2

TABLE J-12

SUMMARY OF STEPS: STEPWISE REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON SOCIAL MATURITY

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	INTRFAC	.5982	.3578	-.0007	.887	7
2	PNON	.5959	.3550	-.0028	.764	6
3	PBIQ5	.5739	.3293	-.0257	.359	5
4	PIBQ6	.5506	.3031	-.0261	.354	4
5	GOAL	.5336	.2847	-.0184	.434	3

TABLE J-13

SUMMARY OF STEPS: STEPWISE REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON PEER AFFILIATION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PBIQ5	.6606	.4363	-.0000	.997	7
2	GOAL	.6537	.4273	-.0092	.565	6
3	PBIQ6	.6213	.3860	-.0412	.221	5
4	INTRFAC	.5798	.3361	-.0499	.185	4
5	PNON	.5292	.2800	-.0561	.167	3

TABLE J-14

SUMMARY OF STEPS: STEPWISE REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON READING VOCABULARY

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PNON	.5164	.2666	-.0000	.999	7
2	GOAL	.5132	.2633	-.0033	.761	6
3	PBIQ6	.5097	.2597	-.0036	.748	5
4	INTRFAC	.5949	.2549	-.0049	.701	4
5	PBIQ13	.4629	.2142	-.0407	.263	3
6	PBIQ5	.3593	.1290	-.0851	.112	2

TABLE J-15

SUMMARY OF STEPS: STEPWISE REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON READING COMPREHENSION

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	GOAL	.5375	.2889	-.0002	.948	7
2	PNON	.5363	.2876	-.0012	.850	6
3	PBIQ6	.5349	.2861	-.0015	.831	5
4	INTRFAC	.5188	.2691	-.0169	.467	4
5	PBIQ13	.4607	.2122	-.0570	.184	3
6	PBIQ5	.3533	.1248	-.0874	.108	2

TABLE J-16

SUMMARY OF STEPS: STEPWISE REGRESSION OF COMPOSITE PRINCIPAL VARIABLES ON TOTAL READING

Step No.	Variable	R	R^2	Change in R^2	Observed Sig. Level	No. of Variables in Equation
1	PBIQ6	.5295	.2803	-.0000	.989	7
2	GOAL	.5293	.2801	-.0002	.939	6
3	PNON	.5291	.2799	-.0003	.924	5
4	INTRFAC	.5215	.2719	-.0079	.620	4
5	PBIQ13	.4666	.2177	.0543	.193	3
6	PBIQ5	.3597	.1293	.0883	.105	2

APPENDIX K

GLOSSARY OF VARIABLES AVAILABLE FOR USE IN THE STUDY

GLOSSARY OF VARIABLES AVAILABLE FOR USE IN THE STUDY

Background Information Variables

PBIQ1
Highest level of professional preparation

PBIQ2
Presently enrolled in a degree program

PBIQ3
Articles or presentations in the last 5 years

PBIQ4
Approximate number of articles/presentations

PBIQ5
Sex

PBIQ6
Participation in IGE staff development workshop

PBIQ7
Years of teaching experience

PBIQ8
Years teaching in present district

PBIQ9
Years teaching in present school

PBIQ10
Years teaching in IGE schools

PBIQ11
Number of district committees of which one is a member

PBIQ12
Number of professional organizations

PBIQ13
Number of professional organizational meetings attended/year

PBIQ14
Number of offices held in professional organizations in the last five years

PBIQ15
Age

PBIQ16
Number of meetings of I and R Unit per week

PBIQ17
Time spent in planning, etc., each week by unit

PBIQ18
Total years in present unit

PBIQ19
Organization characteristics (Composite)

PBIQ20
Overall feeling about your school

Utilization of Time Variables

PNON
Total noninstruction (hours)

PIIIA
Supervision of pupils

PIIIB
Planning

PIIIC
Testing/Assessing/Evaluating

PIIID
Record keeping

PIIIE
Inservice training

PIIIF
Clerical/Secretarial

PIIIG
Administrative

PIIIH
Other

Self-Observation Scales (SOS) Variables:

ACCEPT
Self-acceptance

SECURITY
Security

MATURITY
Social maturity

CONFDNT
Social confidence

SCHAFFIL
School affiliation

TCHAFFIL
Teacher affiliation

PEERAFFIL
Peer affiliation

Reading Achievement Variables

VOCAB
Vocabulary

COMPREH
Comprehension

READ
Total Reading

Mathematics Achievement Variables

MATHCOMP
Math computation

MATHCONC
Math concepts

MATHAPPL
Math applications

MATH
Total Math

Organizational Variables

PRLDRSHP
Leader behavior of principal

TOTJSAT
Total job satisfaction (teachers)

SCHSIZ
School size (total number of pupils

PRSAL
That part of the principal's salary for instruction per student

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